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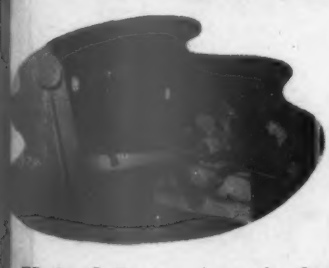

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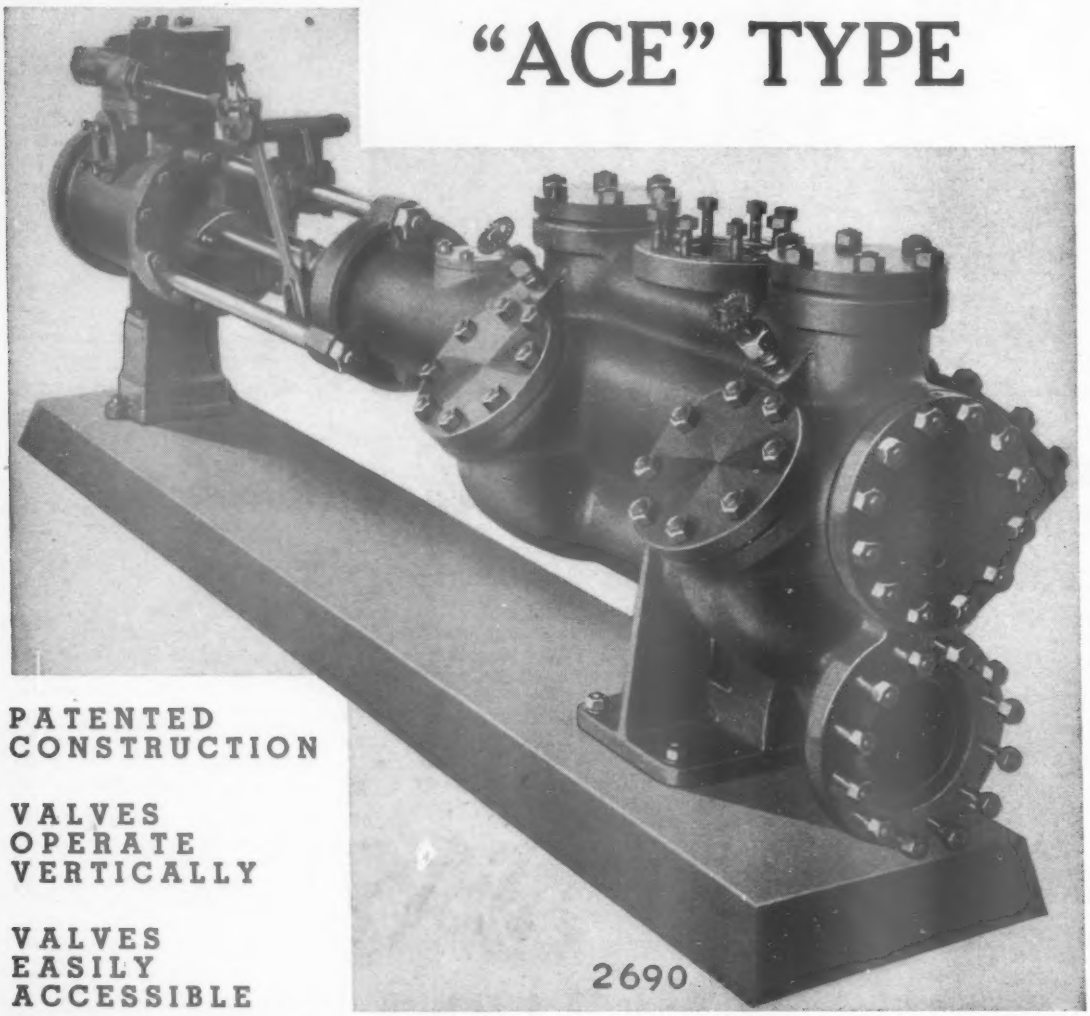

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Trends

Crude-Oil Production
By States — Page 68

CRUDE-OIL STOCKS 235,998,000 bbl., as of Oct. 23—up 2,001,000 bbl. One year ago 237,986,000 bbl.

GASOLINE STOCKS 68,796,000 bbl. as of Oct. 23—up 614,000 bbl. One year ago 77,057,000 bbl.

RESIDUAL FUEL-OIL STOCKS 64,747,000 bbl. as of Oct. 23—down 771,000. One year ago 79,142,000.

GAS OIL AND DISTILLATES 43,309,000 as of Oct. 23—up 1,072,000 bbl. One year ago 48,102,000 bbl.

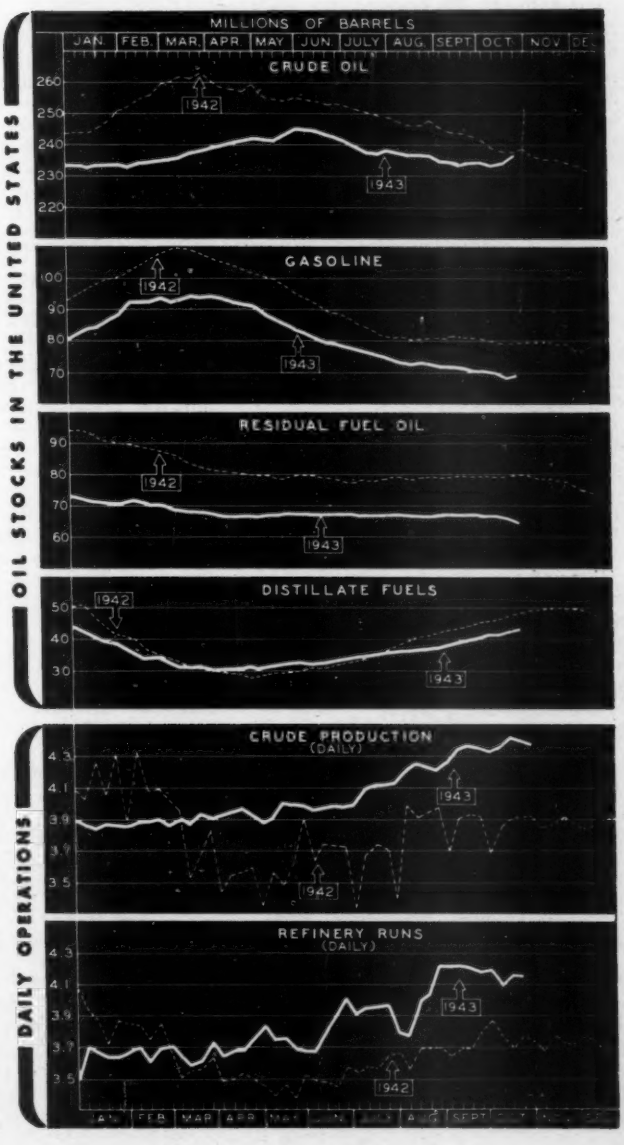
CRUDE-OIL PRODUCTION 4,396,300 bbl. daily average—down 18,750 bbl. One year ago 3,926,510 bbl.

REFINERY RUNS 4,160,000 bbl. daily week ended Oct. 23—down 11,000 bbl. One year ago 3,775,000.

STATISTICIANS of the petroleum industry are stressing the importance of the greatly improved transportation conditions in relation to the problem of balancing future supplies and demands. In general the stock situation in this country as revealed by the tables and charts on this page is less favorable than it was a year ago despite the record crude-oil production and refinery operations. The point stressed by the statisticians is that while these data reflect over-all shortages at this time, the return to more normal transportation conditions will assure that conditions will not become critical in certain areas as they did a year ago. So far as the eastern part of the United States is concerned sufficient transportation is now available by water, pipe line and tank car to give that area its full share of the total supplies east of the West Coast.

THOSE is close touch with conditions stress the importance of the 20-in. products line which will extend from the Gulf Coast to the Atlantic seaboard via the Middle West. The line to the Middle West will be completed the first of next month and to the Atlantic seaboard in January. The completion of this line will mean that pipe-line deliveries to the eastern part of the country will total in excess of 700,000 bbl. daily early next year. While civilian and military demands in that area will increase next year the completion of the pipe lines, coupled with enlarged coastwise tanker and inland waterway shipments, will end any danger of a tight transportation condition. In regard to tanker movements, the coastwise shipments from the Gulf to the Atlantic seaboard averaged 210,000 bbl. daily in September with further increases in October. Tankers of large capacity are now being completed at the rate of one a day in this country.

MORE water and pipe-line transportation means additional tank cars will be available to relieve local conditions which have not benefited from the major transportation changes. Plans have been under way for some time to use tank cars in the movement of crude oil from West Texas to refineries in District 2 which have capacity in excess of their present runs to stills. This involves arrangements in which refiners would be compensated by the Government for the additional transportation charges. As additional tank cars become available more cars will again be used on the short hauls in the movement of refined products. Over the past year practically all of these shipments have been by tank trucks.



Octane Rating and Volatility of Gasoline Limited by PAW Directive

Two actions of PAW pertaining to manufacturing operations are summarized here. They are the outgrowth of rising demands for aviation gasoline and of the necessity for limiting the quality of civilian products in order to achieve the primary objective.

WASHINGTON, D. C.—Ceilings on the octane rating and volatility specifications of civilian motor fuel were established here November 1 at levels substantially below those previously prevailing. The Petroleum Administration for War sent telegrams to all U. S. refiners setting new maximum specifications for motor gasoline to conserve tetraethyl lead and volatile fractions. The antiknock ceilings limit premium gasoline to a maximum of 76 octane and house brand to a top of 72 octane.

Concurring in the new PAW directive, Ethyl Corp. informed all licensees this week that, effective November 8, Specification 4 is being revised to provide for a minimum of 75 octane on premium gasoline at point of sale. The difference of 1 octane number in the PAW maximum and the Ethyl Corp. minimum at point of sale, it was assumed by refiners, was to provide for shipping losses.

Reduction in the quality of domestic motor fuel has been under discussion for several weeks as the refining industry and government officials sought methods of increasing the manufacturing capacity of aviation gasoline. The constantly rising demands for tetraethyl leal was said by Earl Webb, president of Ethyl Corp., to have necessitated the lower minimum specification for premium motor fuel.

Changes in the volatility specifications of domestic gasoline will contribute to the over-all supply of aviation gasoline, and make it possible for refiners to approximately maintain the current volume of domestic production. By diverting the lighter hydrocarbons to production of aviation gasoline that were previously retained for the sake of meeting volatility specifications in domestic motor fuel the total supply of the former will be increased. Conversely, by raising the initial boiling point and end point of domestic gasoline, the volume may be approximately retained with a sacrifice in volatility. Early in the war, the minimum octane number of premium gasoline was lowered to 78. On October 16, 1942, supplies of tetraethyl lead had improved to a point justifying reinstatement of the minimum 80-octane number.

Last January, a provisional modification of the minimum octane number to 78 was made by Ethyl Corp., providing refiners were prevented from meeting the higher specification of 80 because of production of war materials. Because of the large number of plants producing all possible war products, there has been considerable 78-octane premium motor fuel on the market in the Middle West for several months.

Further restrictions on the operations of individual refineries to increase production of petroleum products most needed for the war are called for by the Petroleum Administration for War in instructions sent to all PAW district refining directors.

The instructions establish three preference groups of products, and district directors are told to assist refiners in adjusting their yields to obtain the highest possible quantities of the most-needed products. This is not a formal priorities system, and is subject to adjustment to meet local conditions and changing needs.

One effect of the instruction probably will be to increase the trend toward production of a larger percentage of war products at the expense of civilian motor gasoline, but the system permits flexibility in adjusting the operations of a particular refinery. District directors are to inform refiners of PAW's suggested preference groups, and to report instances where deviations are felt to be advisable.

Acting Petroleum Administrator Ralph K. Davies explained that the demand for these important petroleum products has become so great that competition has begun to develop between various consumer agencies in an attempt to fill their claimed requirements. He said:

"To eliminate any uncertainty on the part of refiners as to which petroleum products are more essential and, therefore, should be made, if necessary, at the expense of other products, we classified the essential petroleum products in three categories.

"The three groups are listed in order of priority, and any product appearing in one group should have preference over the production of materials listed in lower groups or not listed at all.

"Products listed in Group 1 should be given unquestioned preference over the manufacture of any other petroleum materials, even though other production is curtailed. Products listed in Group 2 should be made, if necessary, at the expense of all products except those listed in Group 1, while materials in Group 3 should be made at the expense of all materials not listed in Groups 1 and 2."

Group 1 includes aviation-gasoline blending agents, such as alkylate, hydrocodimer, codimer for hydrogenation, B-B cut for alkylation or polymerization, toluene, butadiene, and petroleum synthetics.

In Group 2 are listed 87 and 91-octane number aviation gasolines and base stocks for finished 87-octane aviation gasoline and higher, aviation and heavy duty military lubricants, micro-crystalline wax, and coke in the quantities and at the plants specified by the WPB.

Group 3 includes 80 all-purpose gasoline, special diesel fuels (such as minus 60 pour-point diesel fuel for the Army and 50-cetane Navy diesel fuel), 73-octane aviation gasoline, and industrial lubricants.

If an individual refiner believes that, for special reasons, products in one of the lower groups should be given preference over products in a higher group, the refiner is requested to consult with the appropriate PAW district director of refining. The PAW official will advise what action should be taken to meet the refiner's problem and yet be of benefit to the over-all program.

Mexico's Production Rate Continues Moderate Rise

Daily average production from properties under the management of Petroleos Mexicanos increased to 3,145,605 bbl. in August, a daily average of 101,471 bbl. The production rate in August compared with output of 3,102,002 bbl. in July, a daily average of 100,065 bbl.

Poza Rica, Mexico's most prolific producing area, registered a slight decline in August, dropping to a rate of 56,566 bbl. daily compared to 56,796 bbl. daily in July.

THIS WEEK

PRICES—Flat rejection of the blanket increase in crude-price ceiling issued by Economic Director Fred Vinson. . . . Directs Petroleum Administrator Ickes to formulate incentive plan (1) to stimulate exploration, and (2) for financial assistance to secondary-recovery producers. . . . ¶Industry sees question pointed back at subsidies, which it finds as unpalatable now as before decision. . . . ¶Oil-state congressmen ready to tack price legislation on some pet administration bill, BUT hopes are not high. . . . Industry finds numerous flaws in Judge Vinson's arguments. . . . Concedes, however, that once on the books, as it now is, the decision will be difficult to expunge from the record. . . .

REFINING—Current production of aviation gasoline more than four times greater than early last year, within few months will be double current rate. . . . Present production exceeds the 1944 goal of ultimate requirements as set by military and government authorities in 1942. . . . ¶Investment in 100-octane facilities will total about $900,000,000, covering 72 major projects. . . . Thirty-two plants now completed, 40 will be finished within 4 months, leaving 22 on 1944 program. . . . ¶Three-fourths of the total investment being made by oil companies. . . . ¶There will be 126 domestic refineries contributing to 100-octane program when this year's projects are completed. . . . ¶PAW establishes three product classifications, instructs district directors of refining to see that maximum yields are obtained. . . . Quantity and quality of civilian motor fuels may suffer deterioration. . . .

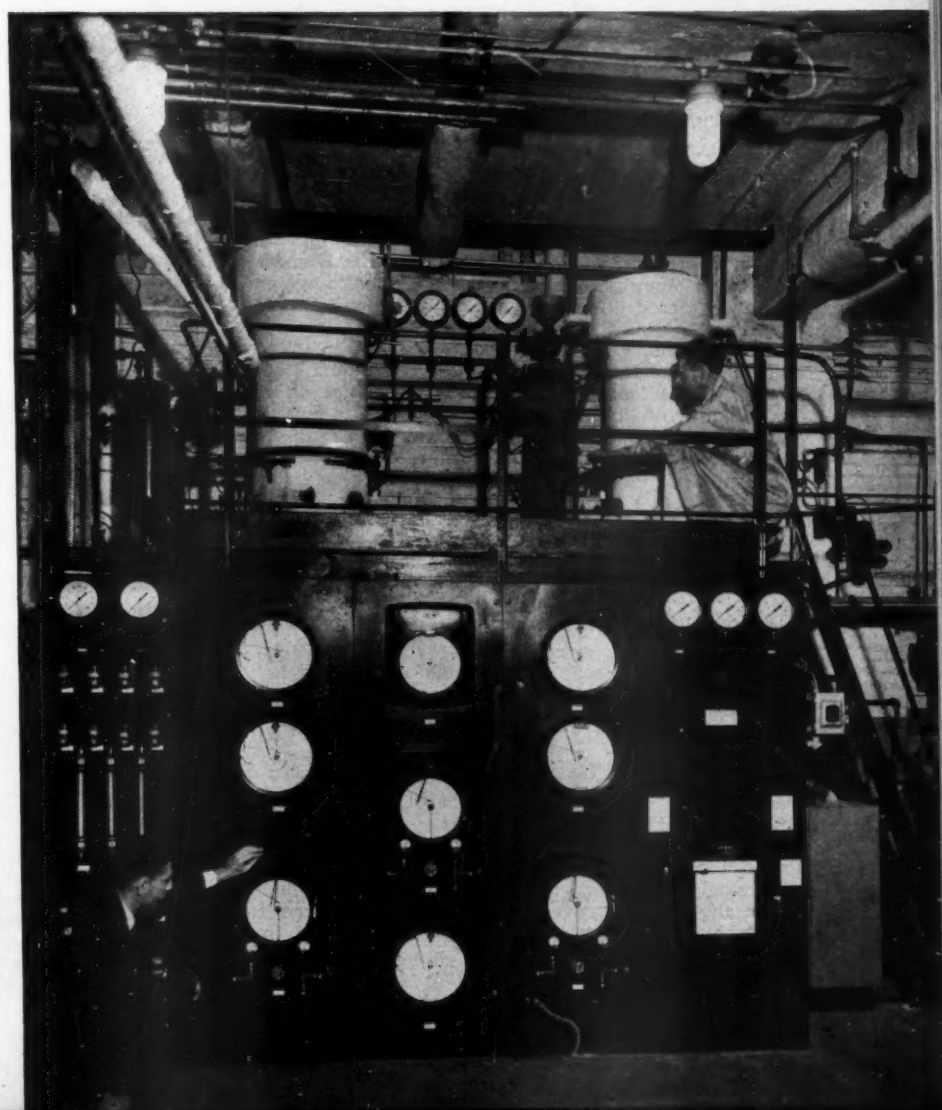
DRILLING—PAW's effort to modify drilling restrictions, predicated on availability of steel, supported by Judge Vinson's rejection of price advance. . . . ¶Switch of emphasis to development may be near. . . .

FOREIGN—Final consummation of United States-Mexico petroleum program anticipated shortly, involving an unknown increase in producing, drilling and refining operations. . . .

SUPPLIES—Petroleum Administrator Ickes discloses that petroleum shipments directly to military forces averages nearly 1,200,000 bbl. daily, half gasoline, the rest covers all other products. . . .

TRANSPORTATION—Corpus Christi-Houston feeder line starts deliveries of 50,000 bbl. daily for transshipment via big-inch, to East Coast. . . . ¶Northbound movement from WEP Longview, Tex., station in October totaled 9,341,514 bbl. . . .

NATURAL GAS-GASOLINE—Tennessee Gas & Transmission Co. orders pipe for 24-in. natural-gas line from Texas to West Virginia. . . . ¶Natural-gasoline manufacturers meeting frequently for discussion of ways to increase production of normal butane and isobutane. . . .



Here's how operating men and technicians gain first-hand experience with the intricacies of catalytic cracking. This pilot plant installed at Atlantic Refining Co.'s Philadelphia laboratories at a cost of $50,000 is now being used to test conditions under which two catalytic crackers will be operated early next year. Similar pilot plants are in service at laboratories of most other refining companies now operating or building catalytic cracking facilities in order that there will be minimum delay between completion of construction and maximum production of aviation gasoline base stocks

Portion of Elk Basin field showing some of the roughness and ruggedness of the terrain which is making access to and preparation of locations difficult

"Jack knife" derrick rig in Elk Basin field. This is on the top edge of one of the highest spots in the field with a steep, narrow winding road leading up to it

Elk Basin May Outrank Salt Creek As Largest Reserve in Rockies

by Neil Williams

CASPER, Wyo.—About all the difficulties, problems and hazards known to drilling and production in the Rocky Mountain district are being encountered in development of the Tensleep sandstone horizon in the Elk Basin field, located on the Wyoming-Montana line, being in Park County of the former state and Carbon County of the latter. In addition, most of these difficulties seem to be present in exaggerated form. Despite this, the field has become the most active spot in the entire district and has one of the largest producing reserves.

Tensleep production was opened at Elk Basin in November 1942. Since then, as of October 15, 16 wells have been completed in this pay, proving a productive area extending more than 4 miles from north to south and over 1 mile from east to west. Daily production has climbed to between 14,000 and 15,000 bbl., placing the field among the four largest producers of the district, with Lance Creek making from 20,000 to 21,000 bbl.; Oregon Basin, about 16,000 bbl., and Salt Creek, 14,000 bbl. On 40-acre spacing it is expected that approximately 150 wells will be drilled within the present proved area, and that within another year daily production will exceed 25,000 bbl. An ultimate recovery probably greater than that of Salt Creek, calculated at 350 to 375 million barrels, is indicated.

Elk Basin is one of the many large, surface-evident structures which fringe the Big Horn basin, which takes in a substantial region in northwestern Wyoming, extending into Montana. Before the discovery of production in the Tensleep Pennsylvanian horizon light oil and gas from the Frontier sands of Upper Cretaceous age, found around 1,350 ft., and gas from the Dakota sand of Lower Cretaceous age around 2,500 ft. were produced. The productive area of these shallow formations covered less than 1,200 acres, and the light-oil production has totaled less than 12,000,000 bbl. since discovery in 1915, with present production only 400 to 450 bbl. daily. The Tensleep at Elk Basin is topped at depths ranging from 4,400 ft. to below 5,300 ft. There is an indicated structural closure of 1,600 to 1,700 ft.

Dozen Rigs Operating

Twelve rigs are operating in the field at this time. Surface holes have been drilled with spudders and surface casing run for six additional operations when any of the above rigs become free or additional rigs are moved in. Locations have been staked for nine other tests. Were it not for the difficult conditions in the field and the current problems of obtaining equipment and manpower, many more operations might be under way.

First among the difficulties of operations in the field, although not the greatest problem, is the terrain which is probably rougher and more rugged than in any field so far developed in the district. Elevation of the general area is from 4,500 to 5,000 ft., but the surface is extremely broken with steep hills, sharp precipices, and gorges. In some places differences between surface elevations of offsets may be as great as 600 or 700 ft.

Both preparing locations and providing access to some locations have presented problems because of the rugged terrain. Outside the producing area of the shallow sands, few roads of any kind existed before the new development started. New roads have had to be cut, some out of the sides of hills and over and around steep grades as additional locations have been made. In many places these are narrow and steep, making hauling of equipment and materials slow and difficult.

Location of the field also is in a more or less isolated area, removed from any cities or towns, railroads and supply centers. All equipment and materials must be trucked long distances and into the field over a single road that only lately is being

improved. Powell, Wyo., the nearest town, is about 15 miles distant, and servicing for the field has not been available there. Major companies have had camps in the field for operation of the older shallow production, but with the new development these have not been adequate, and because of the hazards of the hydrogen-sulfide gas produced from the Tensleep formation the old camps are having to be abandoned and new and larger camps established at safer places outside the field.

Sulfur Content of Gas

Tensleep gas carries 13,000 grains of sulfur per 100 cu. ft., or approximately 18 per cent of H_2S by volume, making it extremely dangerous. The only disposition of this gas so far is by burning in flares. Even with the flares kept burning all the gas does not seem to be consumed. Gas from the shallower horizons is sweet, and most of this is being returned to the formations. The volume of shallow gas is on the basis of a ratio of from 350 to 400 cu. ft. per barrel of oil.

Remoteness of the field from any centers of population also creates a problem for operators and contractors in providing sufficient manpower. Practically all drilling crews are operating shorthanded, and help for other work is limited.

Scarcity of water is a major handicap for drilling. There are no nearby sources of water except a few scattered, small, shallow ponds which are dry most of the time. Although power rigs which require only a minimum volume of water are used exclusively, a substantial volume of water is needed for drilling mud and general use. At present some water must be hauled into the field, but several companies are considering laying a water line to a small river about 17 miles distant.

As in most Rocky Mountain drilling, formations are very hard, requiring numerous bits. As many as 50 to 60 rock bits have been required in some holes. Frequently, only 2 or 3 in. are made with a bit. Coupled with this are very steep dips, in some places as much as 45°, making it extremely difficult to drill straight. An indication of the dip is that the deepest well, only a mile from the top of the structure, found the pay 1,700 ft. below the depth at the top. Only by holding up on the bit, generally with less than a point of weight, and rotating with the bit just touching bottom, in effect just wearing the hole down, can wells be kept from deflecting too greatly. Long drill collars are employed to good advantage to hold the string stiff at the bottom. Contractors are held to a maximum of 4° deviation from vertical. Frequent hole surveys are necessary to insure against drilling too far in deflected holes. When a hole begins to drift too far, the only remedy is to come back up and straighten out with a whipstock. This also is not easy in hard formation, and often is a slow tedious operation.

All this takes time and adds appreciably to the cost of drilling. This is one district, however, in which there is everything to lose and nothing to gain by trying to speed up drilling. Any driller who attempts to make a little faster hole will find himself in trouble with deflected hole, and will lose more time than he had made by having to back up and redrill. In addition he runs the chance of sticking

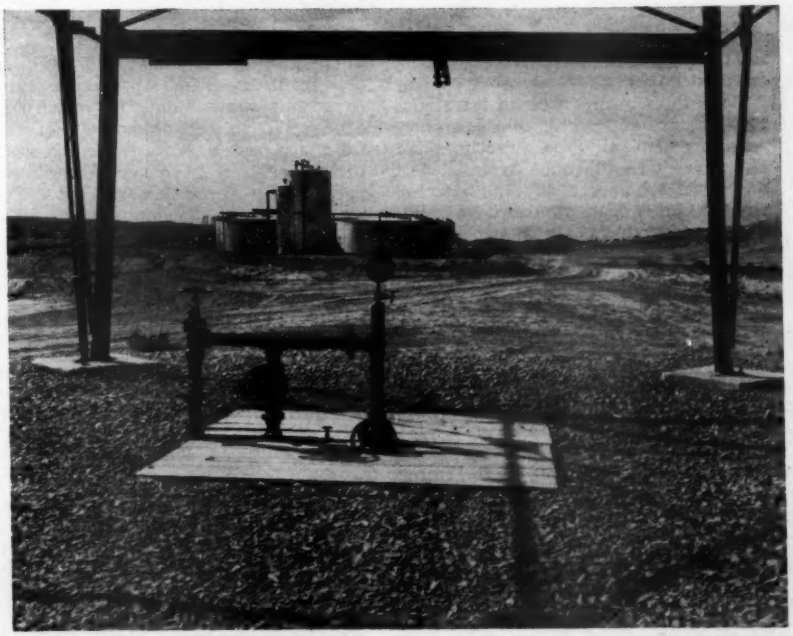
Elk Basin Discussion First of Series On Rocky Mountain Operations

NEIL WILLIAMS, associate editor of The Oil and Gas Journal, this week completed a 6-week swing through the fields and operating headquarters in the Rocky Mountain district. Recent discoveries in the Rocky Mountain area indicate that the district will lead the entire country this year in the volume of newly proven reserves.

The trip covered the exploration, development and production operations of the Big Horn Basin in northwestern Wyoming and southern Montana, where an extensive drilling play is under way in proving up the stratigraphically older horizons, principally the Tensleep sand. In this basin are such fields as Elk Basin, Oregon Basin, Garland and the very recent discovery at Gebo. More than 25 drilling rigs are now running throughout this basin, and more are being moved in.

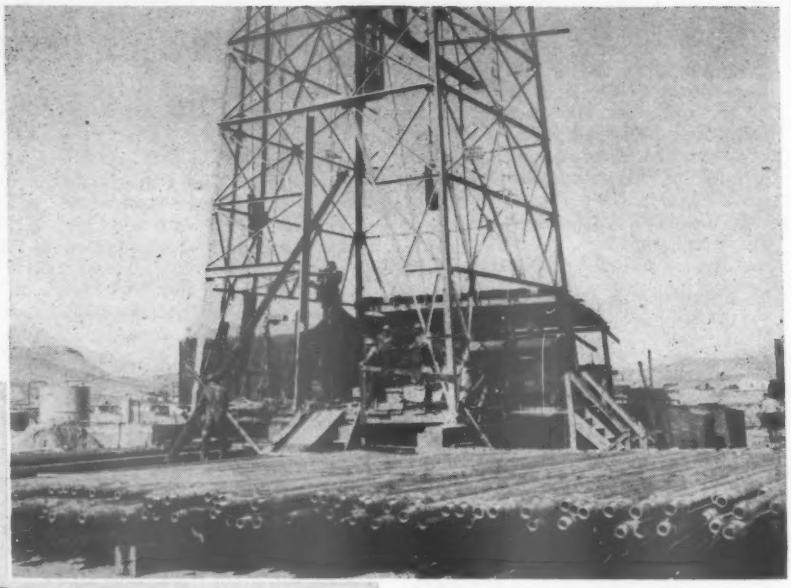
Also visited were the fields of the Lost Soldier area, which include the Wertz Dome, where Sinclair Wyoming Oil Co. is carrying out a highly successful pressure-maintenance project. Considerable time also was spent in the Salt Creek and Lance Creek fields.

NEIL WILLIAMS

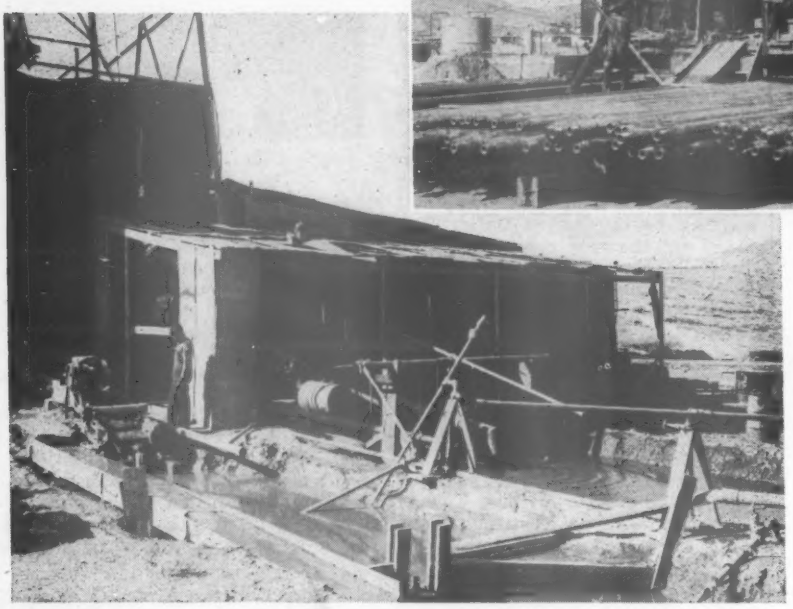


Minnelusa Oil Corp. 1-ET-A Henderson, discovery well of Tensleep (Pennsylvanian) production, Elk Basin field, Park County, Wyoming, showing central-lease stock-tank battery in background

Right: Running oil string in Tensleep well in Elk Basin field. This is one of the larger rigs in the field, and includes separate rotary drive employing 225 hp. multicylinder engine



Below: Typical mud system on rig in Elk Basin field showing single mud pump (under cover) powered by horizontal gas engine. At left is type of shale shaker, driven by single-cylinder gas engine used in the field.



or twisting off the drill pipe in a crooked hole.

Conditions on the crest of the structure are not so severe, comparatively speaking, and fair time sometimes can be made without much trouble, but down the structure as dips become steeper, increasing trouble is experienced and added precautions must be taken. At best, however, on top the structure, wells require 60 days. Normally, wells down structure will take at least 90 days, even without fishing jobs, which are frequent, or other mechanical trouble. Because of this time and other hazards and costs, contractors in the field are getting from $8 to $10 per foot, making total well costs high.

Short bit footage adds to the number of round trips that must be made, increasing the wear and tear on hoisting equipment, engines, lines, tool joints and drill pipe. Life of drill pipe is comparatively short, and with replacements of any equipment hard to get, problems are great.

Lost circulation is another complication with which operators have to contend at Elk Basin. While some wells have had very little trouble along this line, the majority have. In drilling to the Tensleep, various fairly porous sands, some of which are productive in the older part of the field, are passed. Also, there are fractured sections in other formations, particularly in the shales. As it is not the practice to set an intermediate casing string anywhere between the bottom of the surface pipe and the final producing horizon, circulation can be lost in any of these upper formations. This has occasioned the loading of the mud system with considerable quantities of formation-sealing materials, and the use of quite a bit of Aquagel in raising the viscosity and decreasing the filtering properties of the mud. In some instances the fractured sections have been so bad that it has been necessary to place cement and then redrill. The cement for such jobs usually is mixed with about 2 to 5 per cent Aquagel by weight.

Often, porous and fractured sections may be drilled through and the hole carried to some considerable depth below them before they start taking circulation. It may not be known just where the loss of circulation is occurring, and if loading the system with formation-sealing materials and otherwise conditioning the mud does not stop the trouble, and it is necessary to place cement, the operator then must endeavor to determine where this loss is. This sometimes takes considerable time and trouble in running plugs at various depths.

Red Beds Present Hazard

An anhydrite section at the top of the Spearfish red beds, encountered around 4,000 ft., just below the Sundance formation, presents another hazard. The calcium sulfate, although ordinarily not considered soluble, is taken into solution in the mud in this case, flocculating the inorganic colloids, causing the pH to go up and resulting in a high water loss. The water loss under these circumstances often will exceed 100 cc. at 100 lb. pressure for 30 minutes. The water may readily find its way into porous or fractured sections leaving the solids to build up in the hole behind the pipe, which in turn may stick the pipe and result in twistoffs and fishing jobs.

Operators in the field, however, are beginning to pay more attention to conditioning the drilling mud with materials, particularly organic starch products, to control the water loss, with the result that less trouble is being experienced.

(Continued on page 22)

The next story on Rocky Mountain operations will cover the engineering phases of gas dehydration at producing wells before it is delivered to transmission lines. This work is particularly important in cold climates.

Rejection of Crude-Price Advance Confirmed by Vinson's Decision

by Henry D. Ralph

WASHINGTON, D. C.—Denial of a general increase in the price of crude oil by the Office of Price Administration has been upheld by Judge Fred M. Vinson, director of economic stabilization, in a decision issued October 29.

The matter was before him on appeal by the Petroleum Administration for War on its application for a general increase of 35 cents per barrel in the OPA crude-price ceiling, which had been twice denied previously by OPA.

Director Vinson said that petroleum needs for the war could be met by greater use of productive capacity in West Texas, by increased drilling in proven areas, and by greater development of oil resources in foreign areas.

To increase production in the United States, he directed the PAW to formulate a program to provide "additional financial incentives"—meaning a subsidy or bonus — for exploration and development of new fields, and "additional financial support for marginal stripper well and repressuring operations short of a general price increase."

The decision thus separates exploration subsidies from high-cost production, and may leave the door open for selective-price increases in certain localities or for certain operations. It is also stated that no oil producer has filed an appeal against the OPA crude-oil ceiling, indicating that individual producers may still obtain increases on a showing that the price is below their costs.

PAW Comment Reserved

PAW officials reserved comment until they could study the decision carefully. The matter undoubtedly will be discussed at length at the meeting of the Petroleum Industry War Council in Chicago next week.

In Congress, members from oil-producing states were caustically critical of the decision. Sen. Elmer Thomas of Oklahoma threatened legislation to increase the crude-price ceiling, suggesting that oil and farm interests combine to prohibit subsidies and force price increases in basic commodities. However, observers believed that the administration would be able to prevent such action.

William R. Boyd, Jr., chairman of the PIWC, issued a statement saying: "The decision of the director of economic stabilization rejecting the recommendation of Petroleum Administrator Ickes for an over-all increase in the price of crude oil will be keenly disappointing to those engaged in supplying this important raw material.

"The petroleum industry, with substantial unanimity, endorsed the recommendation of PAW, holding that conditions of supply justified completely such action by the Government as a practical measure to increase oil reserves and accelerate activity to locate new sources of supply. Having supported the petroleum administrator in his recommendation, if the fear about possible future shortage of crude-oil supply expressed by the industry and the petroleum administrator should prove well founded, the industry and PAW cannot be blamed."

Judge Vinson admittedly took a short-range view of the petroleum situation. He said the immediate need is for present productive capacity rather than future reserves, that there is no assurance that a price increase would increase reserves and in any event there would be a long time lag, and that action must be taken on the prediction that demand will outstrip domestic production very shortly.

The decision also takes the position that it is useless to attempt to supply all United Nations war needs from the United States, and that military demand can better be met by developing foreign supplies.

The decision attempts to refute one by one the various arguments advanced in support of a crude-price increase, but it is evident that the controlling factor is the effect on the administration's stabilization program. Declaring that there is no proof, or even charge, that the OPA ceiling on crude is illegal, Judge Vinson pointed out that even a small increase in the price of oil might be used as a lever for other price and wage increases until the stabilization program breaks down.

Excerpts From Vinson's Decision

THE recommended price increase cannot be based on any proposition that the petroleum industry has been discriminated against with respect to price control. Stabilization of the prices of strategic materials was early recognized as essential to prevent the cost of rearmament from skyrocketing and to insure smooth flow of those materials to war industries. With the exception of the year 1937, the general level of crude-oil prices in October 1941 at a national average of $1.14 was the highest the industry had enjoyed since 1930.

It is occasionally suggested that an increase in the price of crude is justified on the basis that the present price is significantly below that of 1926, frequently designated as a base year in certain price indices. There is no substance to such an argument. The "parity principle" was accepted by Congress as a valid goal for agricultural prices because below-parity prices accompanied a depressed condition in agriculture. No such case can be made out for the petroleum industry.

It is not urged by the PAW that current oil production is not yielding a fair profit under the existing price ceilings. In fact, current earnings of producing companies publishing earning statements generally exceed those of 1942.

The recommendation of the petroleum administrator for an increase in the crude-oil price ceilings is not based on any representation that our domestic capacity to produce crude oil has been inadequate up to the present date.

Future Demand for Petroleum

The petroleum administrator's recommendation for a price increase looks to future needs. If the problem of future oil supply could be resolved on the basis of estimated total reserves a strong case could be made for the proposition that this nation is in a safe position in that respect (even granting that in recent years additions to estimated known reserves have been largely revisions and extensions of earlier discoveries while new field discoveries have declined in size).

It must be emphasized that the PAW does not represent that oil from all sources will not be availalbe to meet our essential demand in 1944. It is merely that our domestic crude productive capacity will fall short.

Of the prospective sources of additional domestic productive capacity, it is usually stated exploratory activity, the discovery of new fields, is most important. This year it is anticipated some 3,400 wildcat wells will be drilled—an all-time high, and a factor that might suggest that present prices, an expanding market and material priorities furnish an adequate incentive for exploratory activity. This viewpoint gains support from the fact that proven oil properties are now selling at all-time highs—

(Continued on page 18)

Direct Military Requirements Are 1,200,000 Bbl. Daily

WASHINGTON, D. C.—Petroleum Administrator for War Harold L. Ickes disclosed here October 29 that nearly 1,200,000 bbl. of gasoline, fuel oils, lubricants and other petroleum products are now going directly to the fighting forces every day.

A detailed breakdown of the distribution of total petroleum supplies between military and civilian consumers was issued at the same time by PAW, in chart form, revealing hitherto unpublished information.

The administrator's data show that one-third of all gasoline produced in the United States is now required for military purposes. PAW has previously released figures to show that, during 1944, military requirements will exceed 37 per cent of the total gasoline produced throughout the country east of the Rocky Mountains, and will exceed 52 per cent in the Rocky Mountain and Pacific Coast regions.

"The facts which we can now make public show the terrific drain that war is imposing on our dwindling petroleum reserves," Administrator Ickes said.

"They give striking emphasis to the basic petroleum problem with which we are all confronted whether we be oil producers, refiners or transporters, or civilians wishing that we had more gasoline.

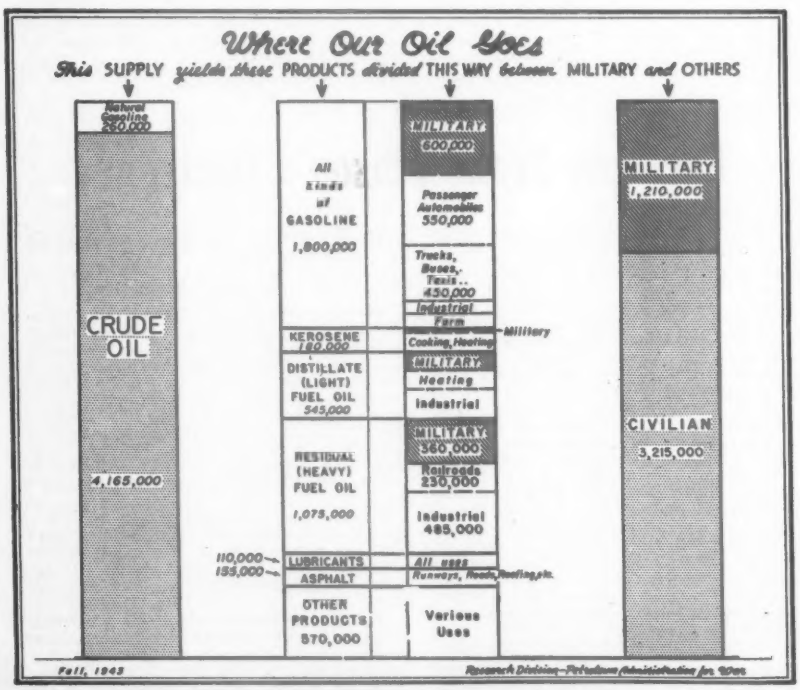
"More than 30 per cent of all our gasoline must now go straight to power the expanding bombing attacks, expanding fighter missions, expanding air-transport operations all over the world and to fuel the thousands of tanks, jeeps, trucks, and motorized artillery on literally hundreds of separate fighting fronts—and the need will increase until this war is won.

"More than 25 per cent of all our light fuel oil must go straight to military power plants, machinery and fighting equipment.

"Approximately 30 per cent of the heavy fuel oil we produce goes straight into the bunkers of our expanding Navy, Merchant Marine, and for dozens of other direct military power uses.

"About one-quarter of the kerosene available today must likewise go straight to war—to warm the quarters of soldiers in Arctic outposts, for cooking and lighting purposes along the global service lines."

The charted breakdown of the distribution of the nation's daily use of crude oil was made public by Deputy Petroleum Administrator Ralph K. Davies. It shows how crude oil is refined into a long range of products, including gasoline, kerosene, light or distillate fuel oil, heavy or residual fuel oil, lubricants, asphalt and other products, and how these in turn are currently divided by war necessity between the military forces and civilians.



All figures in barrels per day based on current requirements determined by the Army-Navy Petroleum Board, Office of Lend-Lease Administration, War Shipping Administration, Office of Economic Warfare, Office of Defense Transportation, War Foods Administration, Office of Civilian Requirements, Office of War Utilities, Office of Rubber Director, Petroleum Administration for War and the Oil Controller of Canada. (Research Division, Petroleum Administrator for War)

La.-Ark. Oil Men Demand Higher Prices for Crude

SHREVEPORT, La. — A resolution demanding higher prices for crude and its products was adopted by the Louisiana-Arkansas division of the Mid-Continent Oil and Gas Association, holding its annual meeting here October 29. The oil men asked too that the petroleum-equipment-supply business be classified by the War Manpower Commission as an essential industry.

Officers of the association were reelected as follows: President, A. H. Tarver, Shreveport; vice presidents, John J. Frommer, Joe T. Goodman, D. W. Harris, L. M. Moffitt and C. H. Lyons; secretary - treasurer, A. R. Campbell.

Charles H. Blish, New Orleans, was named chairman of the legal committee. R. L. Benoit, Shreveport, was renamed chairman of the finance committee. A. R. Carmody was named chairman of the membership committee.

A. H. Tarver, independent oil operator, of Shreveport, and president of the division, presided. Speakers included Judge J. C. Hunter, Abilene, Tex., president of the general association and member of the Petroleum Industry War Council, "Picture of the Oil Setup as Seen in Washington and in the Field"; Clarel B. Mapes, Tulsa, secretary-treasurer of the general association, "Pressing Problems of the Industry"; N. H. Wheeles, Shreveport, independent operator, "Problems of the Oil Well Contractor"; Robert V. Shirk, chief of the manpower section of the Petroleum Administration for War, "Manpower and Related Problems."

Texas Hearing

AUSTIN, Tex.—November 19 is the date set by the state Railroad Commission for its next state-wide oil-proration hearing, at Austin.

FOUNDED IN 1910

BY PATRICK C. BOYLE

the OIL AND GAS JOURNAL

Where From Here?

THE latest statement of Economic Stabilizer Vinson refusing requests for an advance in petroleum prices presents no arguments that have not already been advanced by those who, for reasons best known to themselves, are insisting on market levels which are liquidating the petroleum industry's operations at their source.

In the latest alibi for a wholly unwarranted position more attention is given to the half loaf offered operators in the form of subsidies. This is a confession by top administration officials that they could not entirely overlook the critical conditions in crude-oil production that have been explained to them from every conceivable angle.

Operators should continue to be wary of these subventions regardless of the need for aid and regardless of the additional gilt accompanying the offer. Everyone familiar with oil operations knows that gratuities in the finding and production of crude oil are unworkable. The detail involved would be comparable to a plan in which the Government would attempt to level off the wide differences in costs of farm production through graduated subsidies and then follow these varying charges through the processing operations.

Consumers in the end always pay more for these efforts to solve problems by indirection than they do from plans based on normal business procedure. Furthermore, in accepting subsidies operators will be playing into the hands of those who seek to destroy them. Subsidies of this type mean government control for those who accept them and inevitably these controls in time will encircle every phase of oil operations. This is the objective of an important section of Washington officialdom which hopes that the war's emergency direction of industry can be tightened and widened into permanent controls when peace arrives.

Does the Vinson decision mean that the price increase and allied requests of oil operators are hopeless? The answer is that it does not.

The I.P.A.A. at its Fort Worth meeting outlined what has to be done. It shouldn't be so, particularly in times of national stress, but the decisions made in petroleum prices have been largely political.

Washington still feels that it is good politics to misrepresent and hamstring the petroleum industry. The opposite is true in the case of agriculture and many industrial enterprises.

The solution is to tell consumers of petroleum what is going on and what it means to them. As the association of independent producers which has been on the firing line at Washington during the past 2 years knows, nothing else will do the job.

The enemies of petroleum and those officials at Washington who continue adamant in their refusal to be of assistance because of preconceived war policies are not as secure in their position as they were 6 months or a year ago. Consumers are not accepting the glib explanations of why there are shortages. They will support any program that will aid the war but they don't want that requirement to be made the excuse for circumscribing the operations of an industry around which their entire economy is built.

The fact, as pointed out at Fort Worth, that 11 congressional committee reports, without exceptions, have been favorable to the contentions of the petroleum industry in the present crisis is significant. The same support will come from the public if the facts are presented to them as they were to these committees.

Excerpts From Vinson's Decision

(Continued from Page 15)

additional incentive for the wildcatter. The tremendous increase in wildcatting is made necessary, PAW states, because of the continued reduction in the frequency and average size of new discoveries. Whether manpower and equipment can support the projected wildcat program may be questioned. Even if those bottlenecks are eliminated (as they must be), however, it is stated by the PAW that under the present price ceilings there is insufficient financial incentive to secure drilling of all wells sought. Increase in drilling costs and the smaller and fewer fields discovered are cited as establishing that for many independents the exploratory game is not now worth the candle. Similar arguments are advanced with respect to inadequate incentives for initiation of secondary-recovery projects and marginal stripper-well operation.

Unstabilizing Aspects of Increase

Analysis of a general price increase as a remedy for a threatened deficiency in domestic productive capacity, however, reveals inherent and serious shortcomings.

It is doubtless true that a general price increase would make certain additional exploratory activity profitable. It is just as true that under the existing ceilings many are in no need of assistance in, or incentive for, conducting their exploratory programs. The operation of the 90 per cent federal excess-profits tax, for example, has meant that for many profits can be spent for exploratory activity or for taxes at the company's option—scarcely a Hobson's choice. Notwithstanding that these companies are in no need for further financial assistance or incentives for exploratory programs a general price increase would give aid where none was needed—to the prejudice of the consuming public.

Of even greater concern is the fact that while the general price increase is urged to provide financial support for high-cost additions to the nation's crude oil productive capacity, its effect is to increase the price of every barrel of oil from the upwards of 400,000 producing oil wells—most of which were drilled years previously. There is no evidence that any additional incentive is required to secure production from any significant portion of present known fields.

To grant a 35-cent per barrel increase in the price of crude would enable those producing the larger portion of our crude to virtually double their profit margin and provide additional incentive for production from old fields now producing without it. All this to the main end of encouraging discovery and development of new fields by providing an increased price for oil produced from such new fields. If additional venture capital is needed to support wildcatting surely it is evident a general price increase would not supply the capital where most needed. The indiscriminatory character of the general price increase is dramatized further by the fact that it rewards the additional producer and the merely continuing producer without distinction. Those old producers who engage in little or no additional exploratory activity, no secondary-recovery projects or operations of marginal stripper wells will reap additional profit from a general price increase even though their profits may be already satisfactory. If there are distressed segments of the oil-production industry, they account for a small portion of the production and surely their relief cannot justify aid to all—needy or not. If ever there was a dog-wagging tail, surely the general price increase for oil from new and old fields to secure oil from the former is one.

The cost of this 35-cent per barrel price-increase-incentive plan is for this reason understandably large. OPA and PAW agree that the cost to the buyers of petroleum products would be at least $500,000,000 on present crude production. Actually the operation of other factors might increase the total cost to consumers so that it would be very largely in excess of the $500,000,000. That figure, however, is impressive enough. This huge expenditure would be payable whether new oil is discovered or not. The price is payable without regard to whether manpower, materials and transportation facilities will support additional development and production.

Perhaps the most damning shortcoming of the general price increase as a measure for increasing our available supplies of crude oil is its delay and uncertainty. There is some misapprehension on the subject of when a general price increase of 35 cents per barrel would actually add to our productive capacity in significant amount.

In short, passing for the moment the fact that holding the price line on crude oil is but a part of the larger battle to hold the line in general, a crude-oil price increase of 35 cents a barrel as a production incentive, concededly easier of administration than alternative incentive plans, nevertheless has fundamental disadvantages, when analyzed in terms of the national interest in wartime rather than against the backdrop of "normal peacetime economic principles." Nevertheless, I am in agreement with the petroleum administrator and the price administrator that practical measures must be taken to increase our petroleum supplies. The question thus arises as to whether there are other measures for increasing our supplies of petroleum more certain and less damaging to the wartime economy than a general increase in the price of crude oil.

Practical Alternatives for Augmenting Our Petroleum Supplies

To paraphrase an old maxim, a barrel of crude oil in hand is far better than two yet to be discovered. There are other ways of adding to our petroleum supplies than by drilling wildcat wells in unproven areas. These measures have much to commend them—certainty, economy in use of materials and manpower, and reduction of excessive depletion of this nation's oil reserves. Use of known and available productive capacity is imperative. This means (1) full utilization of the Texas excess productive capacity, (2) increased use of foreign crudes and (3) increased drilling of developmental wells in proven areas. In large part these measures have become practical since the petroleum administrator first recommended the 35-cent per barrel increase.

Use of Texas' Excess Capacity

It has been noted above that the Texas Railroad Commission, charged with the responsibility for regulation of oil production in Texas, study indicates unused productive capacity for that state (over the September production rate) of some 300,000 bbl. daily more or less of crude oil, condensates and allied products. To secure the additional 300,000 bbl. daily no price increase or other financial incentive is required. Transportation and refinery facilities for sour crudes represent the bottlenecks. These bottlenecks must be broken and the PAW is aggressively attacking the problem.

Use of Foreign Oil

Up to this point this country with only about 38 per cent of the estimated crude reserves which General Somervell has stated are available to the United Nations has been supplying from 75 to 80 per cent of the oil for the United Nations' war effort for reasons of strategic necessity no longer in effect. This situation, in a period of increased military use of petroleum products, cannot continue. There can be no justification for exhausting this country's oil reserves at the most rapid rate possible if there is any feasible alternative.

The soundness of a program to integrate into the United Nations' war effort excess productive capacity in the Caribbean area and in the Middle East cannot be seriously questioned. Each barrel of Caribbean and middle eastern oil used in the war effort means an additional barrel for present or future use in this country. Use of

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Fred Vinson, director of the Office of Economic Stabilization, who last week rejected the appeal for higher crude-oil price ceilings

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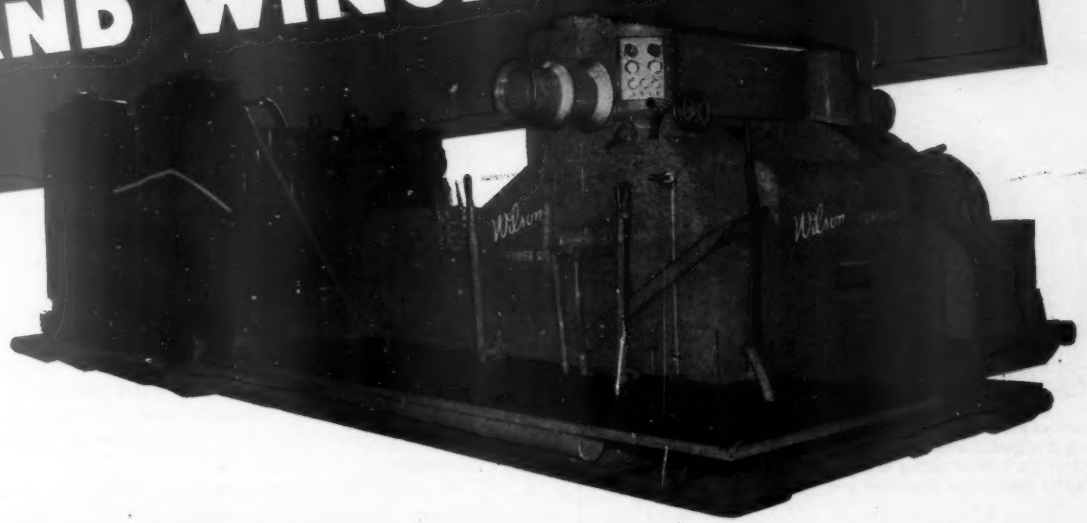

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Two tractors with winch and cable start cold bending a section of ARMCO Pipe. When the pipe end is 3 or 4 feet off the center-line the pipe is allowed to set. The operation is then repeated until the desired curve is achieved.

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available foreign oil will save critical materials and manpower. It represents a certain method for augmenting our supplies. This foreign oil can be had. Transportation facilities can be made available—22 new tankers were delivered in August, 29 in September, and the rate will increase. The shipbuilding program as released by the Maritime Commission on September 24, 1943, indicated that subject to the contingencies of war plans call for the building in the calendar year 1944 some 340 tankers.

For many export hauls Caribbean oil ports are in a more favorable shipping position than the oil-exporting ports in this country. With the Mediterranean cleared for allied shipping the Middle East is now in a much better strategic position. Since offshort shipment to the military theaters must in any event face the perils of the sea use of foreign crudes cannot be stigmatized as impractical because of a submarine menace, which we all hope has been finally vanquished.

It is generally known that there is at present a large and unused capacity to produce crude oil in the Venezuelan oil fields, where many wells of large potential have been capped because of lack of shipping facilities. That available oil can be transported to East Coast refineries and to the European theaters, and as seen above, the shipment has already begun. This office has been informed in detail on this program and it can be stated that very substantial quantities of oil are now entering this country from the Caribbean, and the rate will be very greatly stepped up. Both the president and the deputy petroleum administrator have given public assurance that middle eastern oil will be used to the full extent possible. General Somervell testified on June 24, 1943, before a congressional committee that the estimated oil reserves of the Persian Gulf area total 16,000,000,000 bbl. and that production is available justifying an increase of at least 200,000 bbl. daily in refining facilities in that area. On the basis of information in possession of this office it can be stated that Persian Gulf area refining capacity is being expanded as rapidly as possilbe and significant additions to our petroleum product supplies will be available from this source within the next few months.

Developmental Wells

The drilling of developmental wells in proven areas has historically contributed much more to current productive capacity each year than has wildcatting and the discovery of new fields. In 1940 for example there were drilled a total of 19,125 producing oil wells (including 320 successful wildcats). As is well known, the total number of oil wells drilled in the past 2 years has been sharply reduced in the interest of conserving strategic materials.

Without a doubt the restriction on drilling of developmental wells has saved critical materials and resulted in efficient depletion of our reserves. On the other hand, it seems equally clear that in part the failure to add more substantially to our current productive capacity can also be attributed to the sharp reduction in the drilling of wells in proven areas. With improvement in the supply of other critical materials and the need for increasing our capacity to produce crude oil, the time has come when drilling of additional proven-area wells must be undertaken. In recognition of this the PAW has taken steps to assure adequate supplies of equipment, has liberalized the spacing restrictions in a number of areas and for this next year has programmed a substantial increase in the number of proven-area wells. I am informed that an expected total of 24,000 wells will be drilled in 1944, of which it is anticipated at least 19,000 will be proven-area wells as compared with an expected drilling of something less than 16,000 proven-area wells this year.

To secure drilling of additional proven-area wells no increase in financial incentive is required for the element of risk is not comparable to wildcatting. That is demonstrated by the accelerated rate of drilling under the present ceilings.

Wise drilling of additional development wells can increase our current productive capacity sharply and extend to some extent our proven reserves without seriously reducing the ultimate recovery.

From the measures being taken with respect to full utilization of Texas productive capacity, of available productive capacity in the Caribbean and middle eastern areas, and of increased drilling of development wells in proven areas, it is clear that there is now no thought that the war effort must be staked on the chance that additional new fields of such magnitude will be discovered in this country as to enable domestic productive capacity to keep pace with the war's demand for crude oil. We are informed on high authority that supplies of crude from all sources will be adequate at least through 1945. Use of foreign oil will assure that there will be no lack of oil to fight the war, and at the same time that this country's reserves will not bear so disproportionate a share of the burden of oil supply.

Incentives for Exploration

Notwithstanding the measures above which will insure that our war effort will not flag from want of oil, I am in agreement with PAW, OPA, the Lea and Maloney congressional committees and the Petroleum Industry War Council that, as a safety measure, additional incentive should be provided for increased exploratory activities and development of new fields and to the extent feasible for marginal stripper-well and repressure operations. A practical incentive program to make high-cost operations profitable and at the same time to effect a minimum disruption of the national wartime economy must, however, conform to certain general standards:

1. To be avoided is any increase in the cost of living. This principle presupposes that the financial support for an increased exploratory and development program and for continuation of marginal production which cannot be absorbed by other segments of the industry must come from public funds. Since the necessity for increasing oil production by higher-cost operations is entirely the result of military demands it is only proper that the added cost of producing this additional oil should be borne as a war cost by the Government.

2. To be avoided is any complex scheme for subsidy payments subjecting agencies of Government and the oil industry to impossible administrative burdens, or for that matter any program that invites suspicion by the oil industry that any effort is being made by any government agency to supplant the industry. This latter bogyman will not in my opinion be difficult to elude for it is no more than the product of overactive imagination.

3. To be avoided is any program that rewards without discrimination those who engage in exploratory activity and the development of new fields and those who do neither. In providing financial support for exploratory activity and the development of new fields additional rewards should be limited to those who engage in those activities. Likewise, and to the extent feasible, any additional incentives for initiation of secondary-recovery projects and prolonged operation of marginal stripper wells should be limited to those who engage in those activities.

While the general price increase involves a minimum of administration, it violates the other standards for an acceptable incentive plan. Necessity dictates that there be formulated and put into operation at once other measures to give additional incentive to increase this country's crude-oil productive capacity.

Of the sources of additional productive capacity it has been seen that discovery and development of new fields is one of the most important. To that objective a number of incentive proposals have been addressed.

It appears that under existing law funds in sufficient amount to finance an adequate program can be made available. It may be noted that a 35-cent price increase as an incentive device would saddle the Government with a third of the minimum annual cost of $500,000,000. A selective incentive program may very well be less expensive to the Government while at the same time relieving consumers from any increase in prices of petroleum products. With elimination of a general price increase as a possibility, I entertain no doubt whatsoever of the ability of the PAW in cooperation with the Petroleum Industry War Council to devise a practical, workable program for giving additional financial support to exploratory activity and development of new fields without increasing the cost of living, burdening Government or business with an impossible administrative task or dispensing public funds to those not engaged in exploratory activity or development of new fields.

With respect to marginal stripper wells and secondary-recovery projects it may be feasible to provide additional financial support short of a general price increase. If so, such support would be extended.

Relation to Stabilization

The price and wage control program is the result of a conviction by the legislative and executive branches of government, shared by the responsible governmental authorities in every belligerent nation—ally and enemy alike, that rigid control of the national economy is essential to successful prosecution of total war. The reason is not obscure. Wartime inflationary increases in price and wage rates are not only disastrous to those who have relatively fixed incomes, including the dependents of those in the armed forces, and destructive of insurance and other investment values but as well disrupt the flow of manpower and material into war industries.

There is a not unnatural disposition to recognize only the necessity of stabilizing the other man's prices or wage. It is generally forgotten that one man's price is another's cost. If any significant segment of prices or wages are allowed to rise no control is possible. What must be understood is that the controls on wages and prices are in the nature of a dam restraining natural forces of tremendous power.

Nor is the complexion of the problem changed when the price increase is sought to be justified as a method for increasing production. It may be conceded that additional remuneration must be given on occasion to induce higher-cost production. There is a fundamental question, however, whether that additional remuneration can be given in the form of a general price increase or whether it must be given by some other measure.

That authority was granted it must be noted, as an incident of the hold-the-line order, to implement that order—not to destroy it. To keep faith with the unnumbered millions of wage earners, producers and merchants whose wages and prices have been stabilized, increase cannot be granted in the price of crude oil in light of the other practical measures available to insure an adequate supply of petroleum.

There can be no general increase in the price of crude oil.

The petroleum administrator is directed to formulate without delay a program to provide additional financial incentives for exploration and development of new fields in conformity with the standards outlined above and, if feasible, additional financial support for marginal stripper well and repressuring operations short of a general price increase. On formulation of selective-incentive programs by the petroleum administrator consistent with the stabilization program the economic stabilization director will direct execution of the programs by such other agencies as may be concerned.

Federal Order Digest

Petroleum Administration

Foreign—Directive reorganizes Foreign Division into three sections headed by W. B. Heroy, production; William D. Crampton, supply and distribution, and C. Stribling Snodgrass, refining, issued October 28.

Lubricating Greases — PAO 10, amended: Permits use of fats and fatty oils in manufacture of certain lubricating greases without regard to proportions added, issued October 27.

Administrative—District 5 Authority, amended: Authorizes director in charge to issue exceptions to Directive 71, issued October 27.

Price Administration

Fuel Oil—RO 11, Amendment 84: Authorizes rationing boards in 17 eastern states and District of Columbia to issue fuel-oil rations for use in generating electric power, effective November 2.

Crude Oil—MPR 436, Amendment 4: Permits upward adjustment of natural-gas ceilings in areas of "local shortages," exempts crude oil handled by WEP from price ceilings, and makes the 17.5-cent increase in Pickens postings effective May 26, instead of September 8, all effective November 1.

Tires—Establishes state quotas for passenger and truck tires for November, cutting truck type 30 per cent and passenger-car varieties 14 per cent below October figures, issued October 29.

Fuel Oil—RO 11, Amendment 86: Affords method through which fuel-oil rationing accounts can be brought into balance, effective November 1.

War Production Board

Conveying Machinery — L-193, amended: Relieves purchasers from filing Form WPB-1593; removes required authorization of engineering services, bids and estimates, issued October 26.

Natural Gas—U-7, replaces L-31: Makes numerous procedural changes, chiefly concerning operations during gas shortages during which industrial consumers are required to use standby fuel, issued October 25.

Priorities—Preference ratings previously assigned six oil companies, covering materials up to a value of $25,459, revoked.

Elk Basin May Outrank Salt Creek

(Continued from page 14)

Lately, a number of wells have found a shalelike section at the top of the producing formation that has shown a tendency to slough off into the hole around the pipe. While as yet it has not been determined what is causing the trouble, it is necessitating special precautions in drilling and in conditioning of the mud.

Rigs being used in Elk Basin are representative of the type generally operated in the Rocky Mountain district. All are power rotaries using, with few exceptions, engines fueled with natural gas. Exceptions are one diesel-engined rig and an occasional butane job on outlying locations. Both regular 136-ft. steel derricks and jack-knife and collapsible-type derricks are provided, some with short substructures and others being set on cribbing corners resting on timber mats. None of the rigs has any elaborate or surplus facilities. Generally, there is only one mud pump, this usually being only 12-in., 14-in. or 16-in. size, powered by a 125 or 225-hp. engine. Draw works may be driven by one or two 225-hp. engines. Many of the engines are of the horizontal type with one or two cylinders. However, there are a number of vertical, multiple-cylinder-type engines in service.

One small shale shaker, powered with a "one-lunger" gas engine, is conventional equipment. Some steel mud tanks with means of heating the mud in winter have been provided, but most of the rigs have only excavated pits. No high-pressure-control equipment is needed.

Extremely cold weather and heavy snows and blizzards are experienced during some winter months, and while operations are handicapped at those times, they can be continued through the winter.

So far as production is concerned, the major problem is market for the oil. Since the crude from the Tensleep is asphaltic there is not much trouble handling it from a physical standpoint, even in the coldest weather, but so far pipe-line outlets have been limited to a small line to local refineries at Greybull, Wyo. Lately, Stanolind Pipe Line Co. has been waiting authorization to lay a trunk line from the field to Casper and Salt Creek, connecting with the company's main line to the east. This will relieve the situation. Although a little above the usual in gravity (30.5° A.P.I.), the crude, like most other Tensleep oil, is classed as "black," a type of oil which in the past has been of use principally for fuels and road oils and for which, until recently, there has been only local demand. While the gas has a high hydrogen-sulfide content, no particular trouble has been experienced so far with corrosion. Wells have working pressures up to 1,200 to 1,400 lb. flowing through tubing and chokes, which, considering the depths, are not excessive. So far, no water has appeared in any well.

DEATHS

Dr. George W. Collier, 82, retired oil operator, died last week in his home in Houston, Tex. Doctor Collier practiced dentistry until 1910, when he retired from that profession. Three years later he became interested in the Spindletop development and drilled many wildcat wells. He organized San Jacinto Rice & Irrigation Co. and Old River Rice & Irrigation Co. and operated them for several years.

Martin T. Bowers, 69, oil producer, died last week in his home in Rouseville, Pa. Besides his oil interests he operated the old Bowers Torpedo Co., now out of business.

Justin H. Bender, 50, treasurer of Old Dutch Refining Co., Muskegon, Mich., died there last week. Before going to Muskegon he was affiliated with Craig Oil Co. in Toledo, Ohio.

Earl Roff, 45, for years associated with oil companies, died last week in Rochester, Pa. He had been in the service of Shell Oil Co., Inc., Taxman Refining Co., Old Dutch Refining Co., and Milan Refining Co.

James R. Howard, 69, electrician for Gulf Oil Corp. in Tulsa 23 years when he retired 5 years ago, died at his home in that city last week.

Lt. R. Glenn Heslep, 26, employed in the material accounting division of Gulf Oil Corp., Houston, Tex., when he enlisted in the Army Air Corps, lost his life in an airplane accident near El Paso, Tex.

Lloyd G. Bender, independent consulting geologist of San Antonio, Tex., died in his home there last week.

J. B. Moses, 71, oil operator and resident of Dallas, Tex., for 50 years, died last week in his home in that city.

Harry DeWitt Wiggins, 55, who had charge of Mid-Continent Petroleum Corp. tank cars in the West Tulsa railroad yards, died at his home in Tulsa last week. He was a native of Kansas and had been in the service of Mid-Continent 26 years.

James H. Ellis, 65, land man for Shell Oil Co., Inc., and a resident of Shreveport, La., for the last 25 years, died last week after a brief illness. A native of Texas, he was employed by Standard Oil Co. for about 18 years, prior to his association with Shell.

I.P.A.A. Frowns on Possible Use of Foreign Oil to Depress Domestic Price

by C. O. Willson

FORT WORTH, Tex.—The membership of the Independent Petroleum Association of America in a series of resolutions October 27—the final day of the 3-day annual meeting held here—made clear to the Washington war agencies and the petroleum business generally where it stood on all the vital issues now confronting the industry.

While pledging continued full support to every effort being made to bring the war to a successful conclusion as quickly as possible, the resolutions adopted, which are summarized on this page, and the addresses of the association's officers and other convention speakers criticized many of the things that have been done in petroleum administration.

In regard to imports and other matters affecting the petroleum industry, the membership reiterated the position of independent producers first taken when the association was organized 14 years ago. The association favors the importation of petroleum at this time so far as it is needed for military and essential civilian uses, but these importations are not to be used to depress prices in this country below profitable domestic levels with a resumption of the prewar policies with peace.

A report of the proceedings of the first 2 days of the fourteenth annual meeting of the Independent Petroleum Association of America and the annual meeting of the National Stripper Well Association was given in the October 28 issue. This report includes parts of an address by Russell B. Brown, general counsel.

of the convention which completed plans to secure the support of the public in assuring that petroleum supplies in this country will be adequate now and in the postwar period.

The association's program for the coming year for which a substantial provision was made in the budget, provides for the use of the press, radio and other publicity media in acquainting consumers throughout the entire country regarding the operating needs of independent producers. As a starter in this program on Tuesday evening, October 26, the three governors appeared on a national radio program answering questions regarding the oil business propounded by a widely known broadcaster.

The association's committee on postwar planning emphasized several problems. The committee recommended that the governmental war agencies "with their accompanying regimentation and regulations" continue only until the emergency ends.

The control of imports to "assure a healthy and vigorous domestic industry" was recommended by the committee which also urged that a study be made of the independent producer's position in regard to the ultimate ownership of Government-owned petroleum war facilities with the particular reference to the big-inch lines. It was pointed out that plans should be under way now in regard to postwar employment. Another recommendation urged plans to "preserve and maintain the position of the independent refiner by safeguarding the conditions essential to his existence."

Crude-Oil Requirements

The statement of the crude-oil-requirements committee, which is composed of representatives of 37 trade associations of the oil industry, covered many of the conditions which were the basis of resolutions giving the objectives of the association for the coming year. Particular attention was paid to the position of 300,000 stripper wells which account for 600,-

Three Governors Concur

Three governors—John J. Dempsey of New Mexico, Coke Stevenson of Texas, and Andrew Schoeppel of Kansas—supported the contentions of the independent producers in well-received talks at the final luncheon meeting. The governors stressed the importance of the oil industry in the economic development of their states and joined operators in criticising as unnecessary and dangerous many of the federal Government's wartime regulations of the petroleum industry.

Governor Dempsey revealed that he had discussed with the other governors present the feasibility of perfecting a nation-wide organization of governors starting with the oil states in order to protect the rights of producers and consumers of petroleum. In this suggestion the New Mexico governor, who served as congressman for three terms and as undersecretary of the Department of the Interior, gave support to what was the keynote

Summary of Annual-Meeting Resolutions

Crude-oil price.—Advances mandatory to stimulate exploratory work, encourage secondary-recovery operations, and preserve stripper wells.

Public relations. — Increase in budget approved in order to aid in informing consuming public of accomplishments and needs of petroleum industry.

Foreign. — Federal Government should provide loans to our nationals in order to make foreign oil reserves available for war effort. Direct participation by Government in oil development abroad or at home opposed. International cartel agreements should not be permitted.

Imports. — Should be limited to quantities necessary for war effort at price which will not jeopardize domestic producing industry.

Petroleum substitutes.—Reasonable funds to federal Government to conduct research in coal, oil shales, and natural gas with information to be made available to private industry.

Government subsidies.—Opposed in the finding and the production of crude oil.

Earnings.—Should be segregated by divisions in integrated operations.

Taxes.—Oppose increase of 100 per cent in Social Security taxes January 1, 1944.

Supply companies. — Should be given essential-industry classification by War Manpower Commission.

Tributes. — To Frank Buttram, retiring president, and Harold B. Fell, executive vice president. Mr. Fell was unable to attend meeting due to illness.

000 bbl. daily of crude-oil production. It was estimated that 12,000 wells would be abandoned this year, making a total of 43,000 abandonments during the past 4 years.

The committee found that the cost of finding, developing and producing crude oil today is 53 cents per barrel higher than the cost reported by the U. S. Tariff Commission at the time prices were frozen. This cost is above the present market price.

The report urged greater consideration for the industry in the matter of manpower and materials. It was pointed out that equipment at idle wells could be used either by reconditioning the wells or through the use of the equipment in new wells provided spacing restrictions were relaxed in shallow fields.

New Officers

I.P.A.A. officers for the coming year are: Ralph T. Zook, Bradford, Pa., president; H. B. Fell, Ardmore, Okla., executive vice president; Russell B. Brown, Washington, D. C., general counsel; C. E. Buchner, Tulsa, executive manager; Lawrence E. Smith, Washington, D. C., research; and Charles Van Vleck, field manager.

State vice presidents are: J. D. Trimble, El Dorado, Ark.; C. A. Johnson, Los Angeles, Calif.; A. J. Crites, Maricopa, Calif.; Warwick M. Downing, Denver, Colo.; J. H. Steinmesch, Eldorado, Ill.; O. L. Sturbois, Vincennes, Ind.; F. C. Stodder, Wichita, Kans.; M. A. Arvin, Owensboro, Ky.; B. A. Hardey, Shreveport, La.; A. H. Ledbetter, Mount Pleasant, Mich.; Thomas J. Jirik, Faribault, Minn.; J. F. Barbour, Jr., Yazoo City, Miss.; Merle Becker, St. Louis, Mo.; A. E. Crumley, Shelby, Mont.; C. J. Dexter, Artesia, N. M.; George M. Holbrook, Wellsville, N. Y.; John M. Lovejoy, New York City; D. T. Ring, Columbus, Ohio; J. Garfield Buell, Tulsa; R. Olsen, Oklahoma City, Okla.; Don T. Andrus, Bradford, Pa.; L. A. Grelling, Tyler, Tex.; Ralph A. Johnston, Houston, Tex.; Fred W. Shield, San Antonio, Tex.; W. L. Stewart, Fort Worth, Tex.; W. S. Hallanan, Charleston, W. Va.; E. J. Sullivan, Casper, Wyo., and Thomas W. Leach, Bismarck, N. D.

Messrs. Brown, Buchner, Fell, Sturbois and Zook of the above officers are members of the executive committee. Other members of this committee are L. L. Aubert, Los Angeles; O. C. Bailey, El Dorado, Ark.; Al Buchanan, San Antonio; Frank Buttram, Oklahoma City; Emery Carper, Artesia, N. M.; N. T. Gilbert, Tulsa; James C. Graves, Saginaw, Mich.; C. H. Lyons, Shreveport; J. A. McCarty, Wichita Falls, Tex.; Harold M. McClure, Alma, Mich.; W. A. Moncrief, Fort Worth; E. C. Moriarty, Wichita; Gilbert J. Mueller, Denver; P. W. Pitzer, Breckenridge, Tex.; Charles F. Roeser, Fort Worth; R. J. St. Germain, Houston; J. D. Sandefer, Jr., Breckenridge, Tex.; N. W. Shiarella, Owensboro, Ky.

J. D. Sandefer, Jr., was elected president of the National Stripper Well Association. H. B. Fell was reelected executive vice president of the association, and Howard J. Whitehill, Tulsa, was reelected secretary and treasurer.

Brown Criticizes Some PAW and PIWC Actions as Harmful

by Russell B. Brown*

WHEN the Petroleum Industry War Council was established as an advisory body to the petroleum administrator, I thought it was not fully representative. I thought that some of the things that were done were unnecessary and some that were necessary were improperly done. All of these misconceptions were spoken of but we were slow to advance our complaints, because we were at war and because of our hope that the petroleum administrator would always leave open the door to his office, and his thinking for people and suggestions that were sound and proper whether they came through this council or from without.

We now know that many of our apprehensions have proven to have been well founded. Some early actions and intemperate attitudes of the petroleum administrator have proven harmful to the industry. His voice as our representative with governmental agencies and with the public was hereby weakened. We have suffered greatly from this. We have been denied steel. We have been deprived of materials and men essential to our operations. Our domestic operations have in many instances been subordinated by Government to the requirements of foreign countries.

Ignored Proven Methods

The producers of petroleum have been injured by the action of some of the representatives of integrated oil companies and by PAW. They were too long recognizing the need for more exploratory and developmental work in the United States. They would not recognize the necessity for applying known methods to make available our known reserves or to find new ones. They have been slow to recognize our problems in the United States and have been unconvincing in their efforts. They have quickly and often urged the availability of foreign sources of petroleum and have been diligent in presenting this case to the public and the Government.

These are mistakes, but they are mistakes of the past. They are not insurmountable and are capable of correction to a large degree. Whatever energy we possess we should exercise constantly to destroy the false barriers in our wartime operations and to insure the application of proper methods that lead to success along sound and known operating practices, recognizing at all times that all operations are tempered or stimulated by the necessities of war.

Two Fundamental Problems

The producers of petroleum are today confronted with two major problems that are economic in nature and fundamental to our existence. These two problems are the price we receive for the petroleum we produce and the domination of the domestic industry by foreign sources of petroleum in the hands of a few in industry and Government. We have a clear record as to our position on price. Our country at war is entitled to the faithful representation of information in the possession of its citizens as much as it is entitled to the possession and service of its men. The information based on the experience of this industry has been made available to our Government.

This association in the very earliest days of our defense effort filed with the Office of Price Administration and the Office of Petroleum Coordinator a full statement of our position. We filed a petition for an increase in our price ceilings.

The PAW has never acted on one petition and not until April 7, 1943, did the office take affirmative action leading to obtaining a price increase. This action was based upon the recommendation of the Petroleum Industry War Council. The council, presumably representative of the industry as a whole, was slow to recognize the various problems of the producer of petroleum. They were more than a year debating the necessity of recommending an increase in price.

*Part of annual report of Mr. Brown, general counsel, at I.P.A.A. annual meeting, Fort Worth, Tex., October 25-27, 1943.

Don't get left

Refiners who put off their post-war planning too long are likely to be left at the post—or at least, not to be in at the finish

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Modern Compressor Stations

*by B. C. Thiel**

In this article the author gives a thumb-nail sketch of a modern compressor station. Each installation will of course have its own peculiar problems, but the points listed here should be carefully studied and incorporated in any design if at all feasible.

AFTER victory, what about the utilization of gas? This question is at least partly answered by three known factors . . . (1) by the promise of a far more intensive need for gas and gas derivatives in the production of synthetics. . . . (2) by the proved increase in oil field life-expectancy afforded by proper recycling and pressure maintenance . . . and (3) by the rulings already adopted by certain states to prohibit the wholesale waste of gas given off by producing oil wells.

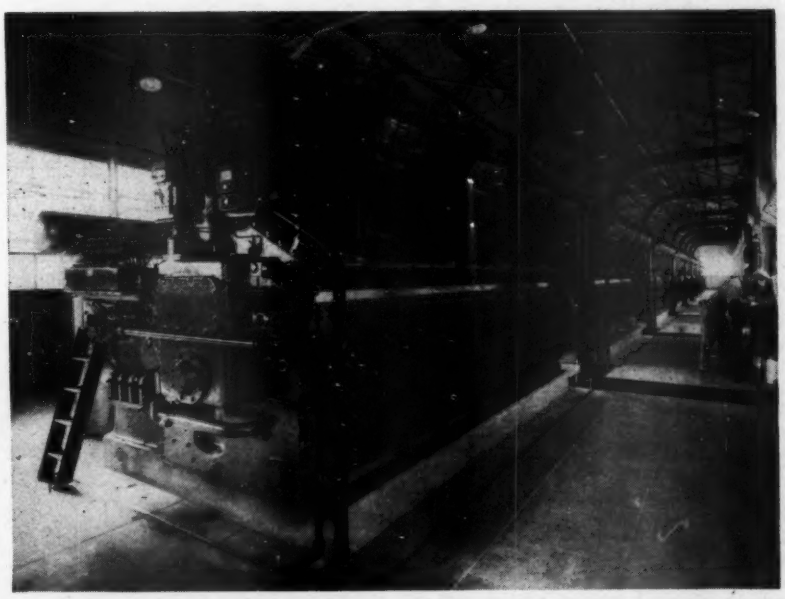
For these and other reasons it seems safe to say that many additional compressor stations will be installed in the postwar period despite the conversion of a large share of gas consumption to peacetime use. So the oil and gas industry is seemingly convinced that the majority of gas-compressor stations are best planned for long-range efficiency, stability and economy; and that initial investment and very careful initial planning so aimed represent sound thinking. All things considered, a discussion of "Modern Compressor Stations" is quite timely.

Although the modern gas-compressor station is the result of practical experience and the application of engineering principles over a considerable period of time, even today we find that there are changes that can be made in its design that will improve its efficiency. The first compressor stations consisted of noncondensing steam engines belt-driving gas compressors and were followed by the direct-driven steam compressors in which the compressor piston rod was a continuation of the steam-engine piston rod, the compressor cylinder being mounted to the rear of the steam cylinder. The first gas-engine-driven compressors were those where a gas-engine cylinder had replaced the steam cylinder on the steam-engine bed or main frame. The cheapness and availability of natural gas aided the development of the gas engine and at the turn of the century, the progenitor of the modern horizontal direct-driven gas-engine-powered gas compressor was evolved. From that time until this, great strides have been made both in the design and dependability of the gas-engine-driven compressor and its auxiliaries.

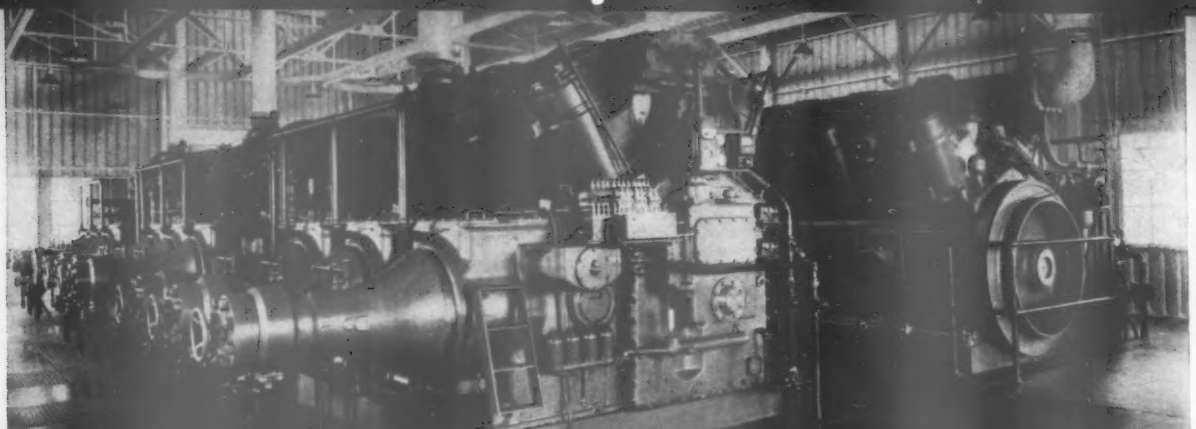
*Cooper-Bessemer Corp.

Compressor Foundations

In order to give a clear picture of what a modern main-line compressor station would consist of, the following description is given: The base for all compressor foundations should be a mat extending under and beyond all compressor foundations unless these foundations rest upon solid rock, in which case the foundations should be insulated from the rock by some vibration-dampening material such as cork. The mat should be large enough to extend to within a foot or so from the building foundations, but should never extend to or under the building foundations, as this would transmit any engine vibration to the building walls. If the ground at the station site is insecure, piles should be driven to solid ground with the outside row of piles sloped with their tops toward the center of the mat. The tops of these piles should be incorporated in the bottom of the mat by means of reinforcing steel. This will prevent, as much as possi-



Installation at El Paso Natural Gas Co., Jal, N. M. The four GMV-8's are rated 800 hp. at 300 r.p.m., the five GMV-6's 600 hp. at 300 r.p.m. Engines were installed March 1940. Engines direct-drive compressors for gas transmission



J. S. Abercrombie and Harrison Oil Co.'s pressure-maintenance plant in the Old Ocean field, Texas, contains 16 GMV-6 engine-driven compressors, this view in second building showing six of eight units in the building

ble, transmission of the engine vibrations to adjacent structures. All of the compressor foundations in any one building should be set on the mat for that building and securely anchored to it. This is the best means of breaking up any horizontal shaking forces as the shaking forces of one unit will have a tendency to counteract the forces of another unless all units are synchronized with each other, a condition that does not exist in a compressor station except for short periods of time. The lower or tension side of the mat should be well reinforced and keys should be cast into the top of the mat at those surfaces where the compressor foundations are to rest so as to tie the mat and the compressor foundations into one solid mass.

The compressor foundations should be keyed into the mat and well reinforced at all points subject to tensile stress. All foundation bolts should be surrounded by a pipe or duct whose diameter is at least 2.5 times the diameter of the bolt and extends into the foundation for a distance of at least 15 times the diameter of the bolt. These ducts should be kept free of concrete when the fundation is poured. This is done to facilitate lowering of the engine base over the foundation bolts. On the large horizontal units where the foundation bolts are very long the duct runs down to the foundation washer so that the bolt can be removed when the engine main frame is skidded onto the foundation. The foundations are generally built with a step or shelf in them approximately 14 in. below the floor line which acts as a support for the floor beams. A step or shelf may also be put in the building wall foundation for the same purpose. When the floor is poured a strip of insulating material such as pitch impregnated felt at least 1 in. thick is put between the edge of the floor and the foundations. This prevents any horizontal forces from being transmitted from the engine foundation to the building wall. By judicious spacing of the foundations no pipe supports for the engine-room floor will be necessary in the basement leaving all basement passageways unobstructed.

Basement

The question of whether or not to have a basement in a compressor station has been discussed for many years but the writer believes that the convenience of a basement outweighs any additional cost that may be caused by its construction. The station basement should be built high enough and the basement piping be so arranged so as to allow plenty of head room and working space around the piping, and should be provided with facilities for proper ventilation. Most basements are now built with but half of their height below ground level which allows for the installation of full-size windows and makes it available for the storage of spare parts and operating stores such as oil and waste. Room for placing a bench for light repair work can also be found in the basement making it handy for the repair crew on rush repair jobs.

Grouting

When grouting an engine the grout should never exceed 1½ in. in thickness and should be practically the same thickness over the entire foundation top. This eliminates excessive and unever shrinkage, which might throw the unit out of line after the grout has dried. All leveling wedges and plates should be removed after the grout has set.

Cooling Water

Although the lack of clean scale-free cooling water wrecked more gas-engine installations than any one other thing, this fact was not appreciated by the operators until a few years ago. The days when the engine cooling water is taken from a creek, pond, or open cooling-tower basin should be over for all gas-engine installations except those of the most temporary nature. In the earlier gas-engine installations the temperature differential between the incoming and outgoing water ran anywhere from 40 to 100° F. These large temperature differences caused undue strains in the engine cylinders and cylinder heads and no doubt were the cause of many a piston seizure, where the piston was not water or oil cooled. The present-day practice is to hold the temperature differential at 20° F. or less with resultant better operation and lower maintenance costs. This involves the use of larger circulating pumps than formerly, but in the long run will decrease the maintenance sufficiently to offset the cost of the additional pump capacity.

The ideal system is a closed cooling-water system. In an open cooling-water system where the water is cooled by means of a cooling tower the daily makeup water is never less than 5 per cent which causes an accumulation of mud or sludge in the cooling-tower basin great enough to necessitate the draining of the system and cleaning of the tower basin every few months if the formation of scale in the engine jackets and cylinder heads is to be held to a minimum. Then, too, the faculty of water in an open system of absorbing oxygen in the form of air makes the oxygen-loaded water highly corrosive when it is heated and the oxygen is released in the engine jackets and heads. This is particularly true in water-cooled piston rods as the oxygen will attack steel with greater avidity than cast iron. In a closed system the amount of makeup water is almost negligible provided the system is free from leaks.

The most reliable closed system is one where the pump draws the water from the overflow tank or standpipe and forces the water through the heat exchanger and the engine to the overflow in the overflow tank or standpipe. The overflow tank or standpipe should have its cover vented to the atmosphere and be so constructed that the water surface exposed to the air is a minimum. The overflow line from the engine should

enter the standpipe a short distance below the normal level of the water in the standpipe so as to prevent any splashing, as this would increase the amount of air dissolved in the water, but should be high enough to provide for a continuous slope upwards from the engine to the standpipe. This will release any entrained air or gas in the cooling-water stream, in fact all piping should have an upward slope from the time it leaves the pump discharge until it enters the standpipe. If, due to necessities of design, the water piping must deviate from a continually rising line at any point, an automatic air vent or a small bleeder line should be installed at the high point in this line. The system should be filled with treated water of approximately the following analysis:

Dissolved oxygen. — Preferably zero, but not over 0.05 cc. per l.
pH value.—not lesst than 8.
Oil.—None.
Suspended solids.—None.
Hardness. — Calcium and magnesium sulfates added, not over 15 p.p.m. Calcium and magnesium carbonates added, not over 75 p.p.m. Organic matter, not over 5 p.p.m. Chloride, not over 6 p.p.m. in terms of chlorine.

Any makeup water should be of the same analysis.

Water Treatment

There are many types of water treatment; the simplest of these is the zeolite process which removes the calcium and magnesium compounds by substituting sodium for the base in these compounds. The lime-soda process, which changes the soluble calcium and magnesium bicarbonates to insoluble compounds that are precipitated and filtered out, is somewhat more complicated and expensive than the zeolite process but is also more efficient. These treatments remove the scale-forming compounds from the water and in addition to these there are treatments with potassium or sodium dichromate to prevent oxygen corrosion and treatments with chlorine or copper sulfate to prevent the growth of algae or other microorganisms.

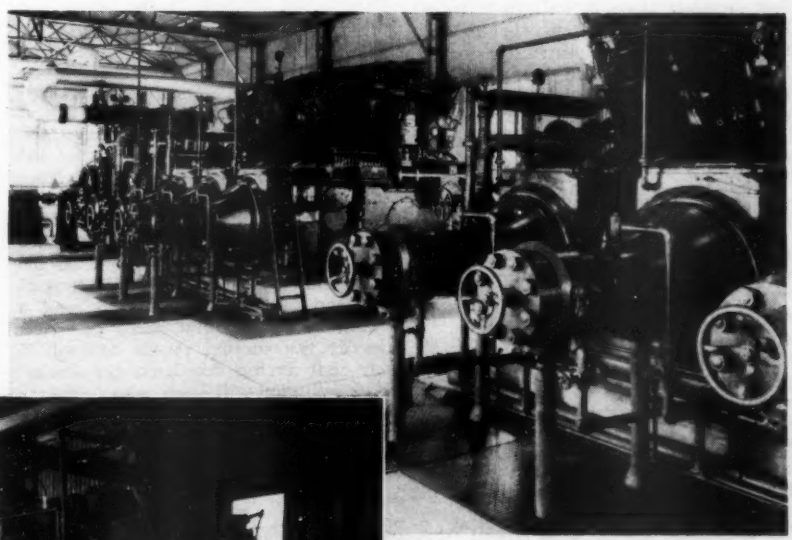
Heat Exchanger

In order to maintain a nearly constant differential temperature between the inlet and outlet water temperatures, an automatic bypass should be installed around the heat exchanger. This bypass is actuated by the temperature of the water leaving the engine and should the outlet temperature of the unit fall below the predetermined temperature the bypass will allow enough water to bypass the cooler to raise the temperature at the engine outlet. This type of regulation is based on a heat exchanger large enough to take care of the entire output of the engine at peak loads with a constant supply of raw water. Another method of arriving at the same result is to regulate the flow of raw water to the heat exchanger by means of an engine-outlet water - temperature-controlled valve. This system requires a raw-water pump of sufficient capacity to take care of the cooling at peak conditions. This system is generally used where raw water is used for other purposes and an abundant supply is available. For best results the oil coolers should be served from a water system separate from the main engine-water supply. All water piping should be calculated for water velocities not exceeding 4 ft. per second, and in case this velocity creates too great a pressure drop due to long pipe lines the size of the pipe should be increased. The quantity of water necessary to cool an installation containing 1,000 b.hp. in main units is 525 g.p.m. for a 20° F. differential, 700 for a 15° F. differential, and 1,050 for a 10° F. differential. These quantities contain the cooling water necessary for the auxiliary engines and other auxiliaries requiring cooling, and are based on the heat dissipation of an oil-cooled piston two-cycle engine with water-cooled exhaust manifolds.

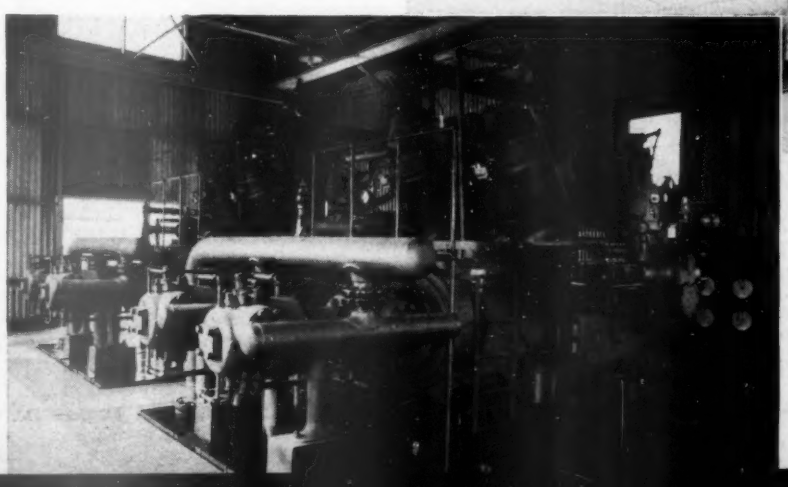
Air Filter

One of the most necessary accessories in a gas-engine compressor station is an air filter on the free air line to the engine. Until one has seen the effects of an air filter, it is hard to believe that stations located just west of the Alleghenies should require one, but in most cases the atmosphere around a gas-compressing station carries enough abrasive grit to warrant its installation.

Some years ago the writer visited a compressor station located in the dust bowl which was an excellent example of what an air cleaner can do. In this station the No. 1 unit was equipped with a Phoenix constant-



Right: Compressor cylinder side from end opposite flywheel of two GMV-6's and one GMV-4 in Francitas Gas Co.'s recycling plant at Francitas, Tex. Plant has daily capacity of 60,000,000 cu. ft. Gas is received from wells producing at 7,400 ft. with a lead pressure of 2,800 lb. at the plant. Engines compress residue gas from 1,800 lb. to a discharge pressure of 3,100 lb. Injection pressure at key wells is 2,920 lb. Engines installed in June 1941



Left: Two GMV-4 compressor units in Border Pipe Line Co.'s station in Jim Hogg County, Texas. Using five angle-type units, the station daily delivers 12,000,000 cu. ft. of gas 152 miles to American Smelting & Refining Co.

effect air filter, having a constantly traveling filter belt moving through an oil bath at its lower turn, about 1 year after it was put into service. The other three units in this station were left without air filters. After this station had been in operation for 11 years the maximum wear in any cylinder on the unit having the air filter on its free air line was 0.033 in. with an average wear over all eight-cylinder ends of 0.025 in., making the average yearly wear for the unit a little more than 0.002 in. This is excellent operation. The other units in this station operating under the same conditions but without air filters had an average wear of 0.018 in. per cylinder end per year, or an average total wear of 0.198 in. per cylinder end, throughout the 11 years of operation. In cases of this kind the air filter would allow the engine with the filter attached to operate nine times as long as the engines without the filter before the reboring point was reached. This is concrete evidence that the cost of the air filter is repaid many times over by reducing the wear on the engine cylinders.

In installing an air filter care must be taken to provide one large enough so that the restriction produced by the filter does not create too great a pressure drop between the outside atmosphere and the engine cylinder. This must be watched more closely in a two-cycle unit than in a four-cycle unit, due to the fact that a slight pressure drop in the air going to the scavenging cylinder of a two-cycle unit will produce a greater effect on the maximum power that the engine can develop than it will in a four-cycle unit. In both two-cycle and four-cycle units any restriction in the free air line will tend to enrich the mixture in the cylinder and cause the engine to run hotter than normal. This condition may cause overheating of the piston and cause it to seize.

Engine Piping

Whiie we are on the subject of engine piping, it might be well to mention that the two-cycle engine is also more critical in regard to the length of its exhaust pipe than the four-cycle engine. All two-cycle-engine builders have conducted experiments on their product, the results of which are available to the purchaser. These experiments were conducted to ascertain the most favorable length of exhaust line to use on any one particular unit. If a muffler is included in the exhaust line, its effect should also be included as it will affect the length of the exhaust line between it and the engine and between it and the atmosphere.

Oil Cooler

If the compressor is equipped with oil-cooled power pistons an oil cooler is a necessity and should be so chosen that the pressure drop through the cooler is at a minimum with a maximum heat-exchange capacity. These coolers should be constructed so that the tube bundle can be removed for cleaning for no matter how clean the filter may keep the oil there will always be some sludge settle out in the oil cooler. The cooling-water circuit that supplies the water to the oil cooler should be divorced from the main compressor circuit as there may be times when the compressor is forced to operate at higher temperatures than are correct for the oil system.

As most oil-cooled-piston engines use the circulating system lube oil as a coolant, the lube-oil system must contain filters that are capable of taking care of the full flow of the oil. In addition to this most units also have a waste type bypass or bleeder filter that removes the finer particles and sludge from the oil. As these filters are very efficient the outlet from them may be bypassed through the cylinder lubricator tanks so as to keep a constant level in these tanks.

Pipe Sizes

In the past the amount of gas delivered by a compressor station has been used as a basis for calculating the pipe sizes used in that station. This method of calculation assumes that the gas is flowing in a continuous stream from the compressor during the time it is in operation. What actually happens is that the compressor takes in gas during only a portion of its entire stroke and discharges the gas during only a portion of the next stroke, the amount of gas taken into the compressor cylinder and delivered by it during one revolution being dependent upon the volumetric efficiency of the compressor cylinder. However, the rate at which the gas is taken in or discharged depends upon the velocity of the piston during the time the gas is flowing to or from the compressor cylinder. In order to visualize this more clearly let us take a double-acting compressor cylinder having a piston displacement of 100 cu. ft. per minute when operating at a speed of 300 r.p.m. and having a volumetric efficiency of 85 per cent during the suction stroke and of 35 per cent during the discharge stroke. This cylinder will then take in 0.2833 cu. ft. of gas during one revolution of the crank and discharge 0.1167 cu. ft. of gas during the same period. If the compressor - cylinder driving mechanism has a crank-to-connecting rod ratio of 1:5, the time consumed during the suction stroke, measured in the time of one stroke, will be 72.14 per cent of the forward stroke and 76.74 per cent of the return stroke or 74.44 per cent of the time of one revolution. As the time of one revolution is 0.003333 minute, the time required for the compressor cylinder to take in 0.2833 cu. ft., which is the quantity of gas taken in during one revolution, is 0.002481 minute. Then the average rate at which the compressor cylinder takes in gas is 114.3 cu. ft. per minute. This means that the suction pipe leading to the compressor cylinder must be capable of handling gas flowing at the rate of 114.3 cu. ft. per minute instead of 85 cu. ft. per minute, as 114.3 cu. ft. per minute is the average rate of flow to the compressor cylinder during the time that it is taking in gas. If the pipe is calculated on 85 cu. ft. per minute it will have 74.4 per cent of the proper area. In the same manner we find that this compressor cylinder will discharge gas during 40.44 per cent of one revolution or 0.001348 minute during which time 0.1167 cu. ft. are discharged at an average rate of flow of 86.6 cu. ft. per minute. A discharge line based on the discharge capacity of 35 cu. ft. per minute would have 40.4 per cent of the required area.

Loss Through Undersize Piping

If the pipes leading to and from a compressor cylinder are too small the pressure drop through these lines will decrease the capacity of the compressor cylinder and will increase the power to compress a unit volume of gas. This is often the reason why compressor stations that are correctly designed as far as compressor horsepower and capacity are concerned do not deliver their rated capacity or are overloaded when put into operation. The intercoolers in a two-stage installation and the aftercoolers in any installation should be calculated for pressure drop using the average rate of flow as outlined above. A restriction here can cause as great a power and capacity loss as too small a pipe size. In a station containing more than one compressor the headers connecting these compressors should be large enough to take care of the gas flowing to or from the compressor cylinders when all units are synchronized basing the rate of flow upon computations similar to those given above. If this is not done the capacity of the station will be decreased and the horsepower per unit volume increased. Horsepower losses have reached as high as 33 per cent of the productive horsepower in some instances where the piping was known to be undersize. Where two or more compressor cylinders on the same service are mounted on the same unit the installation of a large header supplying all of the cylinders will increase the efficiency of the unit. On single cylinders the installation of an intake and a discharge tank will increase the compressor efficiency and also tend to mitigate any pulsations set up by the compressor.

Two-Stage Compression

Theoretically it requires less horsepower to compress gas in a two-stage compressor than in a single-stage

(Continued on page 38)

WORRYING ABOUT SOUR CRUDE?

If you are, one of your worries is the depressing effect of sulfur compounds on the octane rating of the refined products and the very poor response of these products to tetraethyl lead. These serious disadvantages of high sulfur gasoline will both cut down the value of your product and reduce the amount of high octane gasoline you can supply the war program.

But these troubles can be overcome.

PERCO CATALYTIC DESULFURIZATION provides essentially *complete* removal of *all* the harmful, octane depressing, sulfur compounds in gasoline from sour crudes and thus raises the octane rating and improves the lead response. Independent researchers have found that the octane rating of leaded gasoline can be increased by as much as eight points by DESULFURIZATION. If sour crudes are properly handled and the resultant products PERCO desulfurized, they will often be of better quality and give better performance than similar products from sweet crudes.

PERCO CATALYTIC DESULFURIZATION units can make use of existing equipment or equipment made from salvaged materials. PERCO units are easy and economical to operate. The PERCO process has been tested and proven in numerous commercial installations. Let us tell you how PERCO has made money for other refiners. Wire or write for complete information.

PROCESSES ★ ENGINEERING

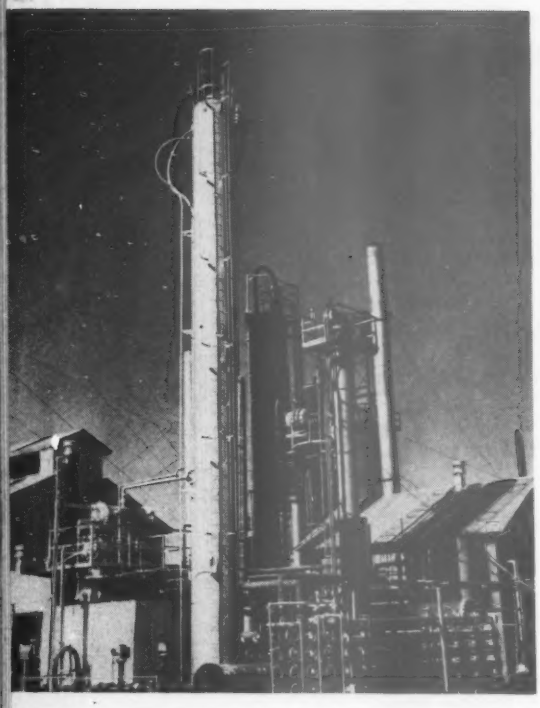
PERCO

RESEARCH ★ CONSTRUCTION

Division of

PHILLIPS PETROLEUM COMPANY, *Bartlesville, Oklahoma*

Sunray Makes Codimer and Polymer Gasoline in Tandem Units



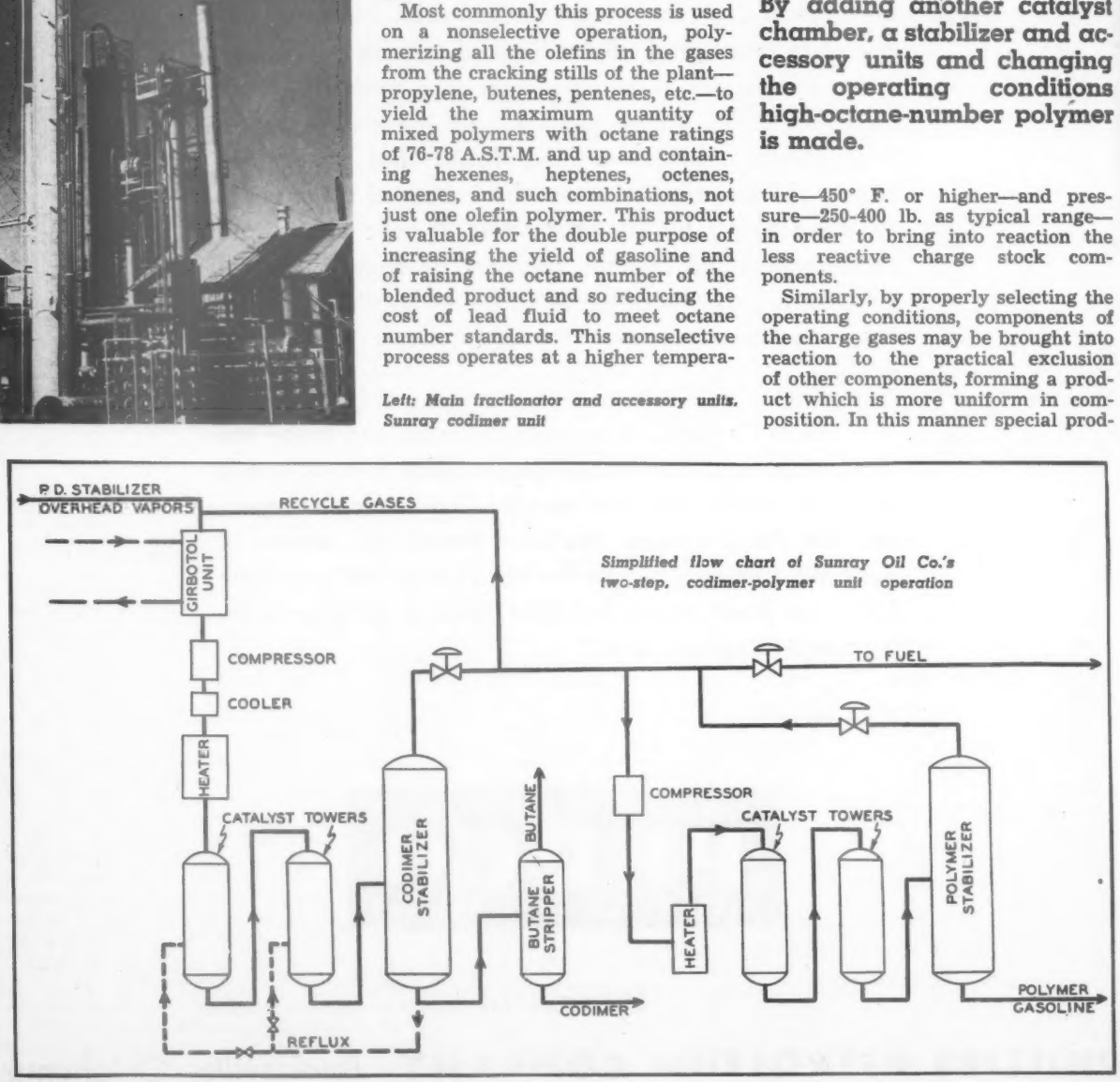
Left: Main fractionator and accessory units, Sunray codimer unit

Codimer is made by polymerizing selectively the butenes (C₄'s) in cracked distillate stabilizer overhead. Considerable percentages of other olefins—C₃'s and C₅'s—remain in the tail gases from this selective polymerization. By adding another catalyst chamber, a stabilizer and accessory units and changing the operating conditions high-octane-number polymer is made.

POLYMERIZATION of olefinic cracking still gases is one of the oldest of the catalytic processes used in the refinery, has served and is serving an extremely important role in refining technology. The process most widely used is the U.O.P. "solid" phosphoric acid catalyst process employed in a large number of large and small refineries throughout the world.

Most commonly this process is used on a nonselective operation, polymerizing all the olefins in the gases from the cracking stills of the plant—propylene, butenes, pentenes, etc.—to yield the maximum quantity of mixed polymers with octane ratings of 76-78 A.S.T.M. and up and containing hexenes, heptenes, octenes, nonenes, and such combinations, not just one olefin polymer. This product is valuable for the double purpose of increasing the yield of gasoline and of raising the octane number of the blended product and so reducing the cost of lead fluid to meet octane number standards. This nonselective process operates at a higher temperature—450° F. or higher—and pressure—250-400 lb. as typical range—in order to bring into reaction the less reactive charge stock components.

Similarly, by properly selecting the operating conditions, components of the charge gases may be brought into reaction to the practical exclusion of other components, forming a product which is more uniform in composition. In this manner special prod-



Simplified flow chart of Sunray Oil Co.'s two-step, codimer-polymer unit operation

General Heading: **BAKER CEMENT WASH-DOWN WHIRLER FLOAT SHOE**

Unit No. **A-27**

Subject: **Securing Successful Cementing Results the First Time.**

BAKER OIL TOOLS, INC.

Main Office and Factory:
6000 So. Boyle Ave., Box 127, Vernon Station, Los Angeles, Calif.

Central Division Office and Factory:
6023 Navigation Blvd., Box 3048, Houston, Texas

Export Sales Office:
19 Rector Street, New York, N. Y.

Index: 250.1

Date: November 4, 1943

Page: 1

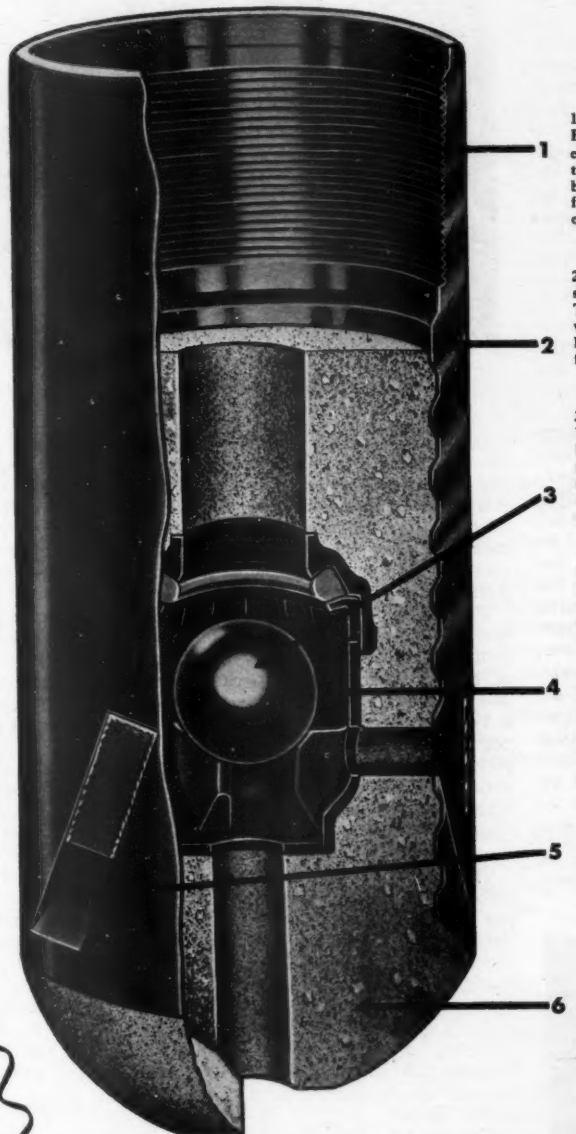
★ ★ ★ ★

Today, a successful first time cement job is not merely desirable . . . it's a "must." Our war needs demand that to conserve vital materials and precious time, *no job* shall be done a second time if it can possibly be avoided.

Baker's contribution to this essential war need is making available cementing devices which afford best possible assurance of *doing the job right and doing it the first time.*

One such device, the Baker Cement Wash-Down Whirler Float Shoe, is illustrated at right. Study it and you will understand why operators who recognize the importance of securing a first time successful cement job, specify "BAKER."

★ ★ ★ ★



1. THREADED CONNECTION FURNISHED TO FIT ANY TYPE CASING. Baker Floating Units can be furnished with threaded connection to fit the specifications of your casing. (Float collars can be furnished with both "female" and "male and female" threaded connections. Manufacturing precision assures thread uniformity and accuracy.

2. AMPLE STRENGTH. The seamless steel casing shoe into which the concrete plug and plastic BALL-TYPE Valve Assembly are securely anchored, provides a unit that has the STRENGTH to float the longest and heaviest string of casing with an ample factor of SAFETY.

3. POSITIVE, LEAK-PROOF BACK-PRESSURE VALVE. The buoyant Plastic BALL-TYPE Back-Pressure Valve floats in the cement slurry or rotary mud and instantly forms a leak-proof double seal against a narrow, tough rubber ring (backed by Plastic and concrete) at the slightest reversal of pressure. Here is Valve efficiency at its best.

4. AMPLE CIRCULATION AREAS. The correctly designed, streamlined Valve Assembly provides passageways ample for any circulating or cementing operation . . . a fact attested to by actual field performance under the most severe operating conditions.

5. BAFFLED WHIRLER PORTS. These whirler ports provide the important wash-down whirler action so advantageous in circulating and cementing operations. When the fluid strikes these baffled ports, a downward and then an upward whirling motion results. In running in, this whirling action provides a means of effectively washing away bridges. During cementing, the whirling action, imparted first to the fluid preceding the cement slurry and then to the slurry itself, properly prepares the hole to receive the cement. It then assures best possible distribution of a uniform body of cement around the shoe and the shoe joint, reducing the hazard of channeling to a minimum. Here is the ultimate in cementing efficiency.

6. EASY DRILLABILITY. Complete and easy drillability results from the internal construction of Baker-Formula Concrete and Plastic . . . the Plastic BALL-TYPE Valve Assembly being set on end in the concrete plug to present a minimum cross-sectional area to the drilling bit. The concrete and the Plastic are quickly and easily drilled up and circulated out of the hole.

Competent Baker men will advise, make suggestions, and otherwise assist in securing best possible results.

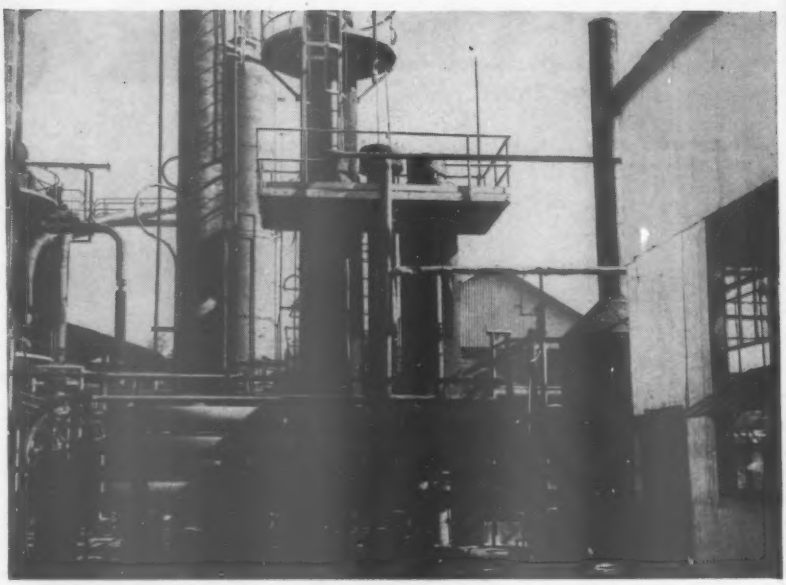
Product No. 120
Baker Cement Wash-Down Whirler *Float Shoe.
*(The Baker Wash-Down principle is also available in a Guide Shoe.)

Baker Cement Float Shoe
Baker Cement Float Collar
Product No. 100
Product No. 101 M&F
Baker Cement Guide Casing Shoe
Product No. 102
Baker Cement Wash-Down Whirler Float Shoe
Product No. 120
Baker Cement Wash-Down Whirler Guide Shoe
Product No. 121

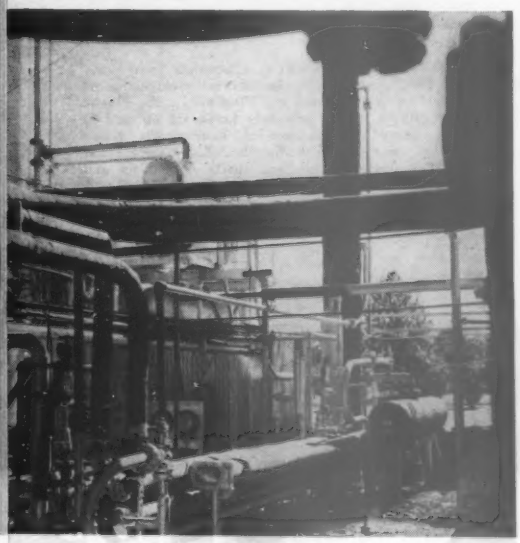
ucts have been made by this so-called selective method of operation for several years.

Along with other refiners, Sunray Oil Co. decided to produce a selective polymer—codimer—for eventual hydrogenation to isoparaffin fuel. At the same time the company engineers wanted to retain, and obtain as much of the nonselective, high-octane-number polymer as possible to boost the gasoline yield and reduce TEL cost in these days when military necessity and political expediency interfere so seriously with good, economic technical operation of refineries. So a system was worked out which enabled the company to carry out both phases of its plan. This system involves a selective polymerization operation on the entire volume of gases from the Dubbs cracking unit, followed by a nonselective operation on the residual gases from the first operation.

The essential features of the operations are outlined in Fig. 1, a simplified flow chart of both steps. The charge vapors are obtained as overhead from the stabilization of pressure distillate obtained by cracking a light and a heavy fraction from Central Oklahoma crudes, using temperatures up to 1,000° F. and yielding a 400° F. end-point distillate which is about 63 per cent of the charge. As a preliminary step the vapors off the pressure distillate receiver, where the pressure distillate from the cracking unit is accumulated as run down from the cracking unit fractionating tower, are brought into contact in an absorber tower, with part of the light oil charge which is eventually cracked in the light-oil section of the cracking unit. Heavier hydrocarbons vaporized in the P. D. receiver are absorbed by this light oil, which is conducted to the cracking unit fractionator where the recovered hydrocarbons are stripped out and recovered, the light absorber oil being preheated and passing to the cracking unit heating section. This step is not shown in the figure.



Two longer chambers polymerize butenes to codimer. Smaller chamber, center, polymerizes C_3's and C_4's to motor-fuel polymer. Polymer cooler coils, lower front



G-lin heat exchanger used as reboiler on stabilizer. Auxiliary reboiler is the horizontal black drum in right background

The raw pressure distillate from the run-down tank — receiver — is pumped to the stabilizer. Operating at 130° F. overhead temperature and 354° F. reboiler temperature the P. D. is reduced to approximately 6 lb. vapor pressure, 106° F. initial, 400° end point. From here the P. D. continues through the remaining refining steps which are of no interest in this article.

Codimer Polymerization

The overhead vapors from the P. D. stabilizer contain approximately 27 per cent of olefins, total, as shown in Table 1. An average sulfur content (hydrogen sulfide) of 0.04 per cent is found in these vapors which pass to a Girbotol desulfurizing unit, and the H_2S is extracted by the organic amine solution, is recovered therefrom by heating the sulfur-rich solution and the sulfide is burned under the refinery boilers.

The H_2S free vapors are compressed to 500 lb. by Clark compressors—in the high-stage cylinders only—driven by 300-hp. gas engines and pass to a cooler where temperature is reduced from 220° F. to about 120° F. Water in the vapor is liquefied and dropped out here, the essentially water-free vapors are heated to 335° F. and enter the first of two catalyst chambers at the rate of about 750,000 cu. ft. per hour, with 1,250,000 cu. ft. per hour of dry gas used as makeup to maintain the system's gas volume as required. A portion of the reaction product stream is bypassed and injected into the catalyst towers at about 90°-100° F. to reduce the temperature which rises during passage of vapors through the catalyst bed, the polymerization reaction being exothermic. Temperature is held rigidly at or near 335° F., to further the polymerization of butenes and to discourage the reaction of other olefins present.

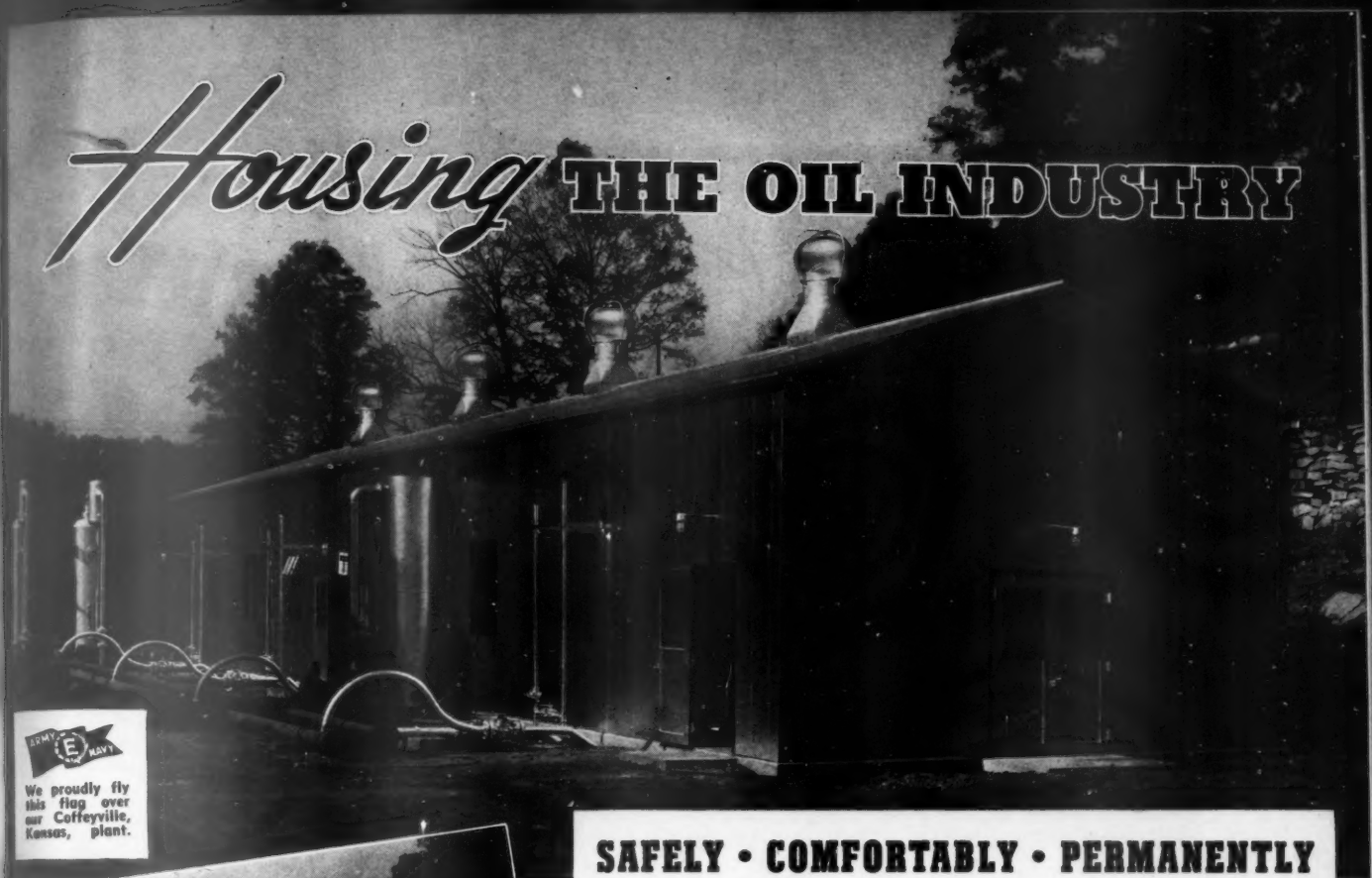
The yield of codimer in the effluent gases from the catalyst chambers is 1.22 per cent of the charge to the cracking unit. There effluent gases enter the codimer stabilizer. Butanes and unreacted olefins are taken overhead, holding a top temperature of 130° F., while the codimer is stripped with a 310° F. reboiler temperature and 260 lb. pressure and run to storage. The codimer so produced is sweet, and requires no other treatment before shipment. Its typical distillation characteristics are shown in Table 2, and range from 120° F. initial to 370° F. end point, after a final stripping in a separate small tower, to 5 lb. Reid vapor pressure.

Polymerization of Light Gases

The overhead vapors from the codimer stabilizer are divided, a portion going as recycle gas again through the codimer polymerization step as gas volume makeup. The remaining vapors are compressed to 250 lb., heated to 460° F. and pass to another pair of catalyst chambers for polymerization. In this step no attempt is made to hold down the temperature, which rises to about 490° F. at the catalyst chamber exit, about 0.5 per cent water being added to prevent drying out the catalyst and

(Continued on page 38)

Housing THE OIL INDUSTRY



We proudly fly this flag over our Coffeyville, Kansas, plant.

SAFELY • COMFORTABLY • PERMANENTLY

With Parkersburg's Famous STEELOX Construction

STEELOX, formed from ARMCO steel sheets into structural pannelled sidewalls and roofs to make up a complete building, provides a tight fitting, interlocking joint to make all connections weather and dust-tight. No puncturing of sheets. Sections complete with accessories and fittings for doors, windows and partitions. Insulation and sound proofing can be obtained to highest degree. Sections heavily galvanized. PAINTGRIP finish furnished over galvanizing, upon specification. STEELOX Construction provides extremely high load carrying capacity, unusual flexibility and durability, and is easily and quickly erected without skilled labor.

See your Composite Catalog, or call your nearest Parkersburg representative for full details.

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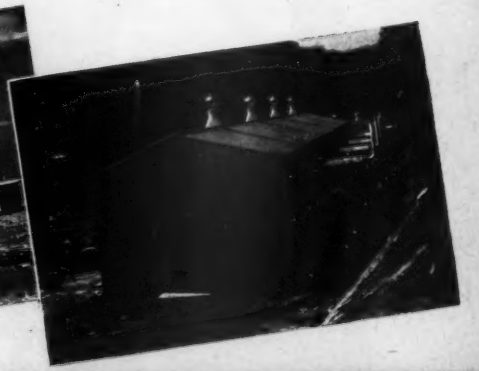


PARKERSBURG

...then perhaps he said to himself

A TEN-MONTH DELIVERY

MR. ROOSEVELT'S LETTER
President Roosevelt's letter to Mr. Churchill read as follows:
Dear Mr. Prime Minister:
When you were with us during the latter part of December, 1941, and the first few days of 1942, after we had become active participants in the war, plans for a division of responsibility between your country and mine became generally fixed
Here there had been developed a welding technique which enables us to construct standard merchant ships with a speed unequaled in the history of merchant shipping.
Atlantic to your mills and ... and then, in form of ... ships, to send them back ... ports for the cargo ... waiting to be carried.
Materials and Time
Obviously, this would ... tailed a waste of ... time.
It was only natural ... to decide that this ... the predominant ... area for us ...
well as in other matters, we agreed that mutual advantages were to be gained by concentrating, in so far as it was practical, our energies in doing those things which each of us was best qualified to do.
Here in this country in abundance were the natural resources ... critical materials.
Here we had waiting cargoes ... be moved in ships to your ... and to other theatres. If ... country was to have ... out its contemplated ship ... uction program it would ... been necessary to move ... mmages of raw materials ... have here across the
... of cargo
Our merchant ... larger and will ... at a rapid ... ever-increasing ... sels we foresee ... ties of no ... your side the ... fleet has been ... you have in ... sequence ... licensed ...
Clearly ... gant were ... enced men ... used as ... fail to use ... a wastage ... side and ... portance, ... facilities

BIG PIECE OF NEWS the Prime Minister read to the House of Commons—the 10-months' delivery of a couple hundred ships.

Again the old formula: BIG name in the NEWS . . . made big by Big Production . . production made big by RECOURSE TO ARC WELDING (remembering Webster's short definition of RECOURSE as "a going to for aid or protection").

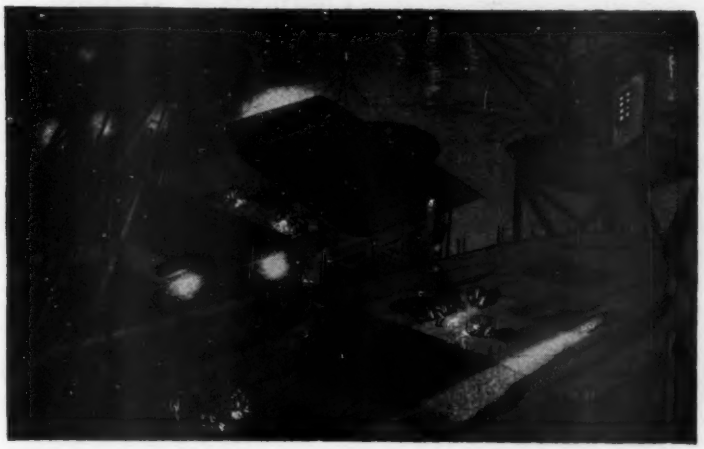
So the President has written the formula into the history of the world: "Here there had been developed a welding technique . . . with speed unequaled."

THE LINCOLN ELECTRIC COMPANY • *CLEVELAND 1, OHIO*

"A Welding Technique" *he said*

★ ★ ★ ★ *"with speed unequalled in the history of merchant shipping'*

...and this, Mr. Prime Minister, is what he meant:



SHOP FABRICATION. Ships welded on a production line by assembly line methods—faster welding by positioning the welding—pre-fabrication of large sections—upside-down assembly—dozens of short-cuts make up this technique, recourse to which has revolutionized shipbuilding.

MASS PRODUCTION. If ships can be put on a mass production basis, think of the speed and economy in producing products less bulky. If speed alone were the only benefit of welding, *recourse* to it might be debatable. But consider these additional benefits:

LESS STEEL
On these 200 ships, *recourse* to arc welding saves 375,600 tons. Steel is critical. Steel costs money.

LESS HULL FRICTION
A welded Liberty ship leaving New York would reach Sicily 40 hours quicker than its rough-skinned sister of equal horsepower.

INCREASED CARGO
18% more cargo carrying capacity is provided by weight-cutting through *recourse* to arc welding.

15 to 20 Ships a Month

In order that the general understanding we reached, during the early days of our engagement together in this war, may be more perfectly carried out, and in order as a practical matter to avoid the prodigal use of manpower and shipping that would result from pursuing any other course, I am directing the War Shipping Administration, under appropriate bareboat arrangements, to number to your flag for temporary wartime duty during each of the suggested next ten months a minimum of fifteen ships.

I have furthermore suggested to them that this be increased to twenty.

We have been allocating to British services on a voyage-to-voyage basis large numbers of American-controlled ships. What I am now suggesting to you, and what I am directing the War Shipping Administration to carry out, will be in the nature of a substitution to the extent of tonnage transferred for the American tonnage that has usually been employed in your war program.

Details of the arrangements we can properly leave to national shipping authorities for settlement through the Combined Shipping Adjustment Board, whose function it is to concert employment of all merchant vessels, and will in accordance with its usual practice do so in connection with these particular ships.

Always sincerely,

FRANKLIN D. ROOSEVELT.

America's greatest natural **recourse**

ARC WELDING

(Continued from page 34)

seriously reducing its activity. The catalyst chambers are in series, gases entering first the smaller and then the larger of the chambers. The polymer produced by this step amounts to 1.36 per cent of the cracking unit charge, as a typical figure. Its initial boiling point is quite low, 60° F. in this example, whereas the 50 per cent temperature is 338° F. with end point at 374° F., indicating a scarcity of light ends; 45 per cent or more of the product distills between 338° and 374° F. Remarkably, the gravity of the codimer is approximately 65° A.P.I., while that of the polymer is about 85° A.P.I.

An interesting sidelight to this combination unit is the polymer stabilizer tower. This tower is built entirely of scrap and spare materials found at the plant. The main column is a section of 20-in. pipe flanged at the top, packed with chain. The reboiler is a 9-ft. section of 20-in. pipe, placed horizontally, with a coil of four lengths of 1-in. pipe into which steam is admitted to reboil the polymer. A standby auxiliary heater is made from a section of a G-fin heat exchanger which increases the reboiler capacity when and if it is required by any particular operation.

While it is not probable that the operations of two refineries are entirely similar, this system outlined here and employed in this Sunray plant is applicable to any refinery operation where a catalytic polymerization unit is available, and where cracked gases are produced as must be the case if a polymerization unit is utilized. By such a system, which can be varied over wide limits of temperature, pressure, olefin content and percentages of different olefins in the gases, the refiner may produce a specific type of polymer for a special purpose, and then polymerize the remainder of the olefins present to increase gasoline output and reduce requirements for tetraethyl lead.

Assuming that a refiner is interested in producing two types of polymer, or wishes to make motor fuels of two different octane ratings. The codimer produced in this operation has an octane rating of about 82, may be varied through several units by variations in reaction conditions, types of charge stocks, etc. Such a blending stock will doubtless show a much higher octane blending rating than the above figure, probably about 100-octane number or possibly higher, when used in small percentages. Such a stock could be used to advantage especially when it is desirable to produce a premium grade motor fuel with little or no lead. The light polymer produced in this plant shows 72.6-octane number, A.S.T.M., and offers advantages for blending with a regular grade motor fuel with little lead required, especially when its relatively high vapor pressure can be used to advantage to improve the vapor pressure of a relatively nonvolatile base stock.

The possibilities of this operating plan are numerous, and give the refiner the advantage of a high octane number, low vapor pressure blending stock, a medium octane number, high vapor pressure stock which may be used in any number of combinations to blend finished products to a wide variety of specifications.

Compressor Stations

(Continued from page 30)

compressor for any set of conditions, but due to the additional mechanical friction and valve losses this is not true actually. The two-stage horsepower curve lies above the single-stage curve until approximately 4.5 compressions are reached and from this point the two-stage installation will require less horsepower than the single stage. However, the dividing line between single and two-stage compression in any particular installation depends not only on the installed horsepower but also on the economics of the installation and this in turn depends upon so many variables that is a lengthy problem.

Safety Devices

The newer compressors can be equipped with a number of safety devices and controls of which the common safety devices such as the overspeed stop, and the safety stops actuated by low lube-oil pressure, high cooling-water temperature, and subnormal cooling-water flow have been in existence for some time and now we have safety devices that can be attached to the bearings that will shut down the unit if the bearing temperature becomes excessive or if the play in some of the moving parts becomes too great. The number of controls that can be used on a present-day compressor are many, and with various combinations of them practically any type of operation can be controlled. The output of a compressor may be regulated by the suction pressure, the discharge pressure or the quantity of gas compressed. The quantity of gas compressed can also be varied automatically by changing the speed of the compressor up to a certain point and by clearance pockets from there on until the output of the compressor is zero. The torque of a compressor can be controlled so that in an installation called upon to handle a wide range of suction and discharge pressures there can be no danger of overloading the unit when pressure conditions exist that might damage the working parts of the machine. This is done by unloading the compressor cylinder when it is operating in an unfavorable pressure range. In other words, the output of a compressor or the pressures in the compressor can be controlled by almost any factor in the operation of that compressor that is most important in the plant that the compressor is operating in.

The use of medium-speed engines for driving compressor cylinders has decreased the size of the buildings necessary to house the main units in a compressor station. Taking a 6,000-hp. main-line station consisting of six 1,000-hp. V-type engines as an example, we find that the floor space required is 0.7563 sq. ft. per horsepower and the cubic content required is 12.634 cu. ft. per horsepower. In this arrangement we have allowed 10 ft. between the end engines and the end wall and a 5 ft. alleyway around all units. The same horsepower in slow-speed engines would require 1.737 sq. ft. per horsepower and 24.313 cu. ft. per horsepower. Then, too, there is quite a saving in concrete in the engine foundations, the medium-speed engine requiring 140 cu. yd. and the slow-speed engine 250 cu. yd., a saving of 90 cu. yd. or 36 per cent.

The standard main-line station building generally consists of a steel framework resting on a solid concrete basement wall that is carried up to the main floor level. The basement floor is generally not more than 4 ft. below the grade line which allows the compressor piping to come out of the station above grade. The outside headers are then laid on concrete supports and all outside valves are in plain sight of the station operators. Catwalks are built to each valve for the convenience and safety of the operators. A solid brick wall is carried from the floor to the top of the window sill and corrugated transite is used for the rest of the wall and roof. The windows are steel-sash ventilating type and should be as airtight as possible. Although considered a needless expense by some operators, an overhead crane of some sort is essential in reducing the maintenance cost. This crane should have a capacity of not less than 2 tons. The heating can be done by an exhaust-gas furnace or boiler that is supplemented by a gas or oil-fired boiler for emergencies. In the dust-bowl region some stations are supplied with water-washed air which has considerable bearing upon the maintenance cost of units in this region. Another innovation is the placing of the motor-driven water pumps in a dog house at the cooling tower and having them remote controlled from the switchboard in the auxiliary house. This decreases the length of the water lines and also decreases the size of the auxiliary building. The auxiliary building is of the same general construction as the main building but does not have a basement. In it are the auxiliary engines direct connected to generators, the air starting compressors, the station office, spare parts and supplies store room, lockers, etc.

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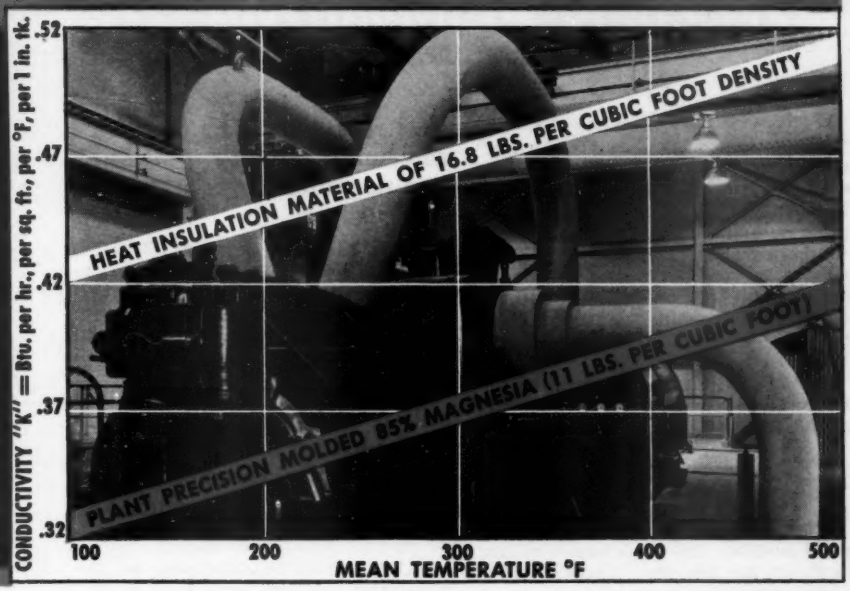

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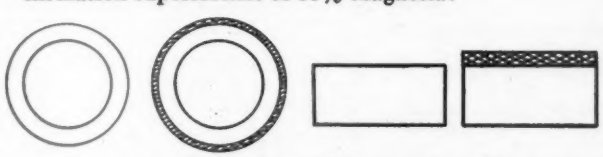
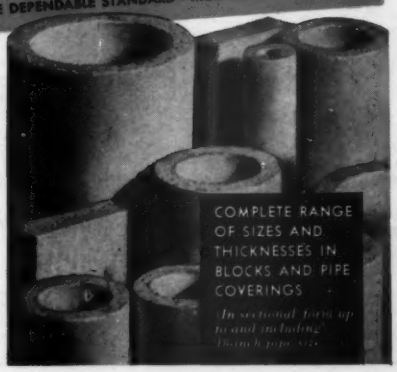


To give the same insulation result, material of 16.8 lbs. per cubic foot density would have to be approximately 29% thicker than Plant Precision Molded 85% Magnesia weighing just 11 lbs. per cubic foot density!

Here at last is unparalleled heat-insulating quality combined with unprecedented light weight! Here too are long-wanted advancements in uniformity, "ductile strength," durability and swift, easy application! To help you utilize the revolutionary advantages of Plant *Precision Molded* 85% Magnesia in your war work, our engineering staff will gladly submit calculations and specific recommendations. Write Today for details about this new standard of heat-insulation efficiency.

*U. S. Patent Nos. 2,131,374, 2,209,752, 2,209,753, 2,209,754



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Cracking Technology—No. 8

Calculations for Reforming Procedures

*by C. R. Wagner**

Best returns are obtained by reforming as long a straightrun naphtha cut as possible, because of the "barrel-octane-numbers" advantage. This article shows the results obtained when running for various octane numbers under different conditions; also the type of charge stocks best suited to several different situations, and the comparative advantages of cracking under different sets of conditions.

IF one were to calculate some fictitious figure, such as "octane-barrels-improvement,"† from the results of the reforming operation, assuming in each case that the same crack per pass is maintained, the calculation would always show that it pays to reform as long a cut as possible. As an example let us take an Illinois straightrun gasoline and the naphthas made from it as shown in Table 1.

For the three grades of naphtha the Research "octane - barrels - improvement" would be as follows:

250-400: 55.7 (0.8 × 65.3 — 33.7) = 1032.7
300-400: 36.5 (0.8 × 62 — 28.2) = 781.1
325-420: 21.3 (0.8 × 56.7 — 20.5) = 529.5

Two factors that are not taken into consideration by such calculations, however, are the lead susceptibility of the total gasoline produced in the plant and the cost per barrel of finished gasoline of reforming the heavy naphtha. We have already seen that this lead susceptibility may be influenced by the mercaptan content of the gasoline. It may also be affected by the percentage of straightrun gasoline in the blend, since frequently such straightrun has a much higher lead susceptibility than any other component in the final blend. By reference to Figs. 1, 2 and 3 it will be seen that these "octane-barrels-improvement" figures do not check with the amounts of lead required to produce a certain octane-number fuel. Or to put it in a slightly different

*Consultant in refining technology.

†Multiply the barrels of reformed gasoline made per 100 bbl. of total straightrun gasoline in the crude by the octane number of the reformed gasoline and subtract the product of the barrels of reformer charge per 100 bbl. of total straightrun by the octane number of the reformer charge.

TABLE 1

	S.R. gasoline	1 — 250° F. end point	1 — 250-400 naphtha	2 — 300° F. end point	2 — 300-400 naphtha	3 — 350° F. end point	3 — 325-420 naphtha
Per cent of straightrun in crude petroleum	100	44.3	55.7	63.5	36.5	78.7	21.3
Gravity, A.P.I.	59.3	72.1	50.6	67.2	48.0	62.9	46.9
Distillation, °F.:							
Initial	90	90	250	93	306	108	320
5 per cent recovered	140	110	269	124	322	138	338
10	161	121	277	139	326	154	344
20	195	140	289	163	332	180	351
30	220	156	301	181	336	200	356
40	243	168	311	196	342	217	362
50	266	179	323	209	349	233	368
60	290	188	334	221	355	248	373
70	316	198	347	233	364	268	379
80	343	216	362	247	373	289	386
90	374	222	382	269	387	318	394
95	394	234	395	289	397	341	401
End point	402	262	405	297	408	353	420
Research octane number	47.5	67.2	33.7	62.2	28.2	55.4	20.5
A.S.T.M. octane number	48.0	65.5	34.0	60.0	30.0	56.5	22.5
Reid vapor pressure	7.6	14.6	0.5	10.8	0.3	9.2	0.1
Tests on debutanized reformate when yield of product is 80 cent:							
Research octane number			65.3		62.0		56.7
A.S.T.M.			59.3		57.2		52.3
Reid vapor pressure			2.3		2.1		2.2

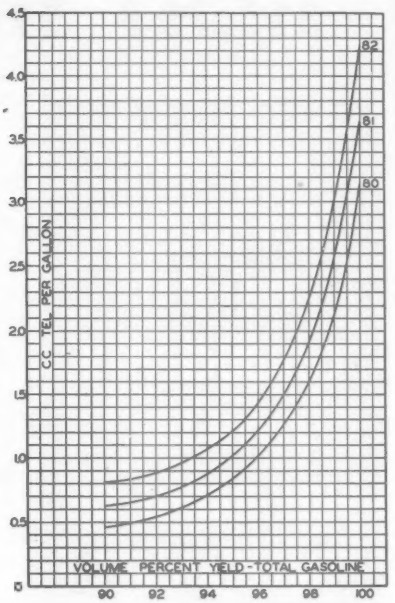

Fig. 1: TEL requirements of Illinois gasoline. Blend of reformed naphtha, light straightrun and cracked gasoline. 225° F. i.b.p. naphtha. (Courtesy Pure Oil Co.)

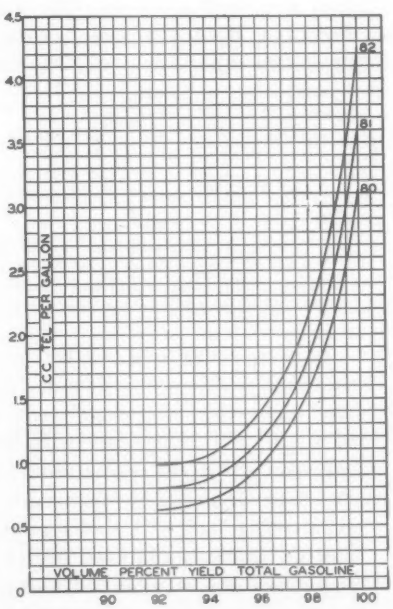

Fig. 2: TEL requirements of Illinois gasoline. Blend of reformed naphtha, light straightrun and cracked gasoline. 310° F. i.b.p. naphtha. (Courtesy Pure Oil Co.)

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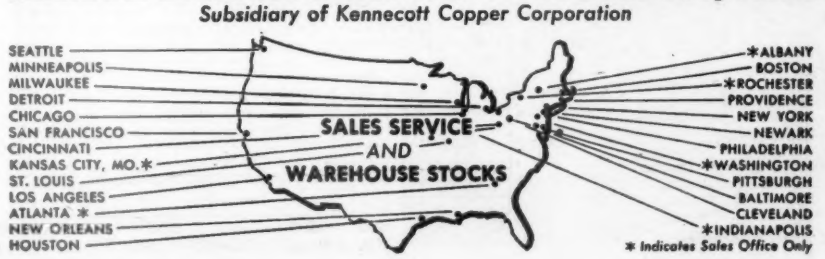

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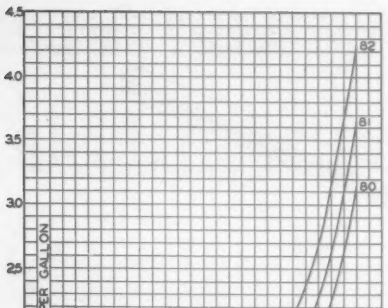


Fig. 3: TEL requirements of Illinois gasoline. Blend of reformed naphtha, light straightrun and cracked gasoline. 325° F. l.b.p. naphtha. (Courtesy Pure Oil Co.)

way, the reforming loss which occurs in producing a gasoline of 81 Research octane number containing 1.5 ml. of TEL per gallon is not in line with that indicated by the above calculation. To produce such a gasoline when reforming 250-400 naphtha a reforming loss of 3 per cent is incurred; for 300-400 naphtha the loss is 2.8 per cent; and when 325-420 naphtha is reformer the loss is 3.6 per cent. For this case, therefore, a 300-400 naphtha should be reformed. If a different amount of lead is to be used in the finished blend the results may be different. For example, if 3 ml. of TEL were permissible, there is a difference in loss of only 0.1 per cent in the gasoline produced. Under such circumstances the advantage from the decreased volume of reforming involved in handling the 325-420 cut might more than offset that from the slight gain in yield possible by reforming the 300-400 cut.

In attempting to estimate the temperature that will be required to reform a given naphtha consideration must be given to the composition and boiling range of the naphtha and to the time factor in the soaking section of the coil. The experiments described above were conducted on a coil in which the soaking volume was held at 40 bbl. (measured at 60° F.) per 24 hours per cubic foot of soaker tube volume. Variations in soaking time due to changing the throughput may be expected to change the crack per pass in a linear ratio if temperatures are held constant. Thus an increase in the above-mentioned 40-bbl. rate to 50 bbl. would reduce the conversion per pass to 40/50 times the conversion at the 40-bbl. rate.

In Fig. 4 are given the rates of decomposition of the n-paraffins[1] as a function of their boiling points. These have been recalculated so that the n-paraffins in reforming naphtha with an average boiling point of 345° F. are considered to have a decomposition rate of 1. Since the decomposition rates of all the other hydrocarbon types except the isoparaffins are much smaller than those of the n-paraffins, no serious error is involved in assuming that the principal reactions occurring in the reforming operation are those affecting the n-paraffins. Although the isoparaffins have a somewhat lower decomposition rate than the n-paraffins, we do not have accurate information concerning them. They are usually present in much smaller quantities than the n-paraffins, and for comparative purposes it can be assumed that the decomposition rate of a given naphtha depends upon the percentage of paraffins found by the usual analytical method. Thus it is to be expected that a naphtha which contains 65 per cent of paraffins will cracking at 65/50 times the rate at which a naphtha of the same boiling range and 50 per cent paraffin content will crack when all other conditions are identical.

Fig. 5 has proved very useful in making such calculations, although it must be emphasized that too great variations in conditions will make the calculations of doubtful value. To use the curve let us assume that it is desired to know the temperature at which a 300-400 naphtha containing 65 per cent paraffins should be reformed in order to get a debutanized gasoline yield of 80 per cent. According to curve C in Fig. 5, a loss to gas and tar (crack per pass) of 10 per cent is found at 944° F. For this naphtha the loss at 944° F. would be

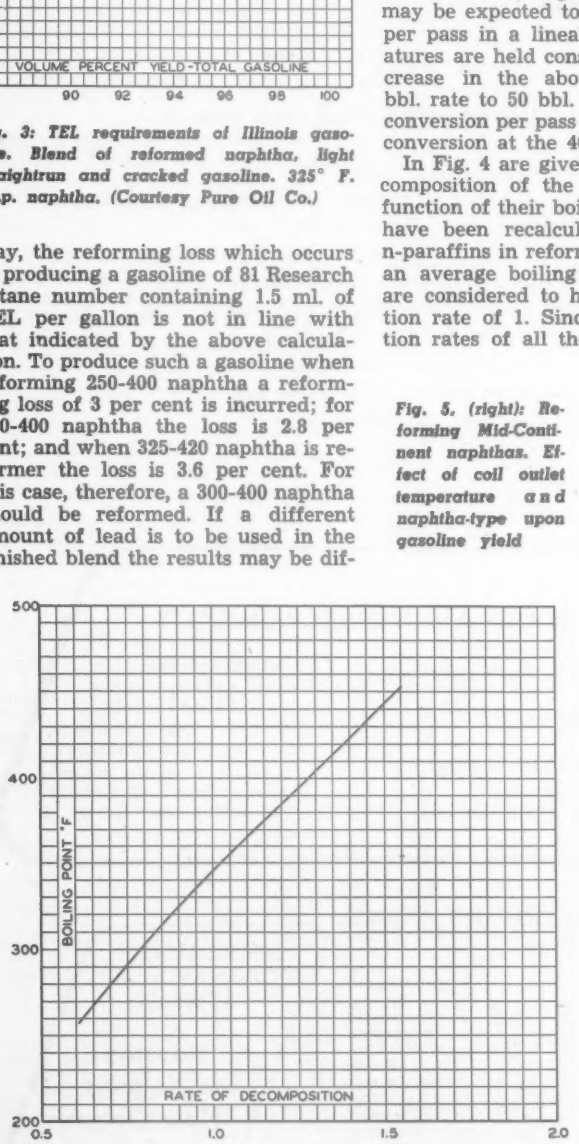
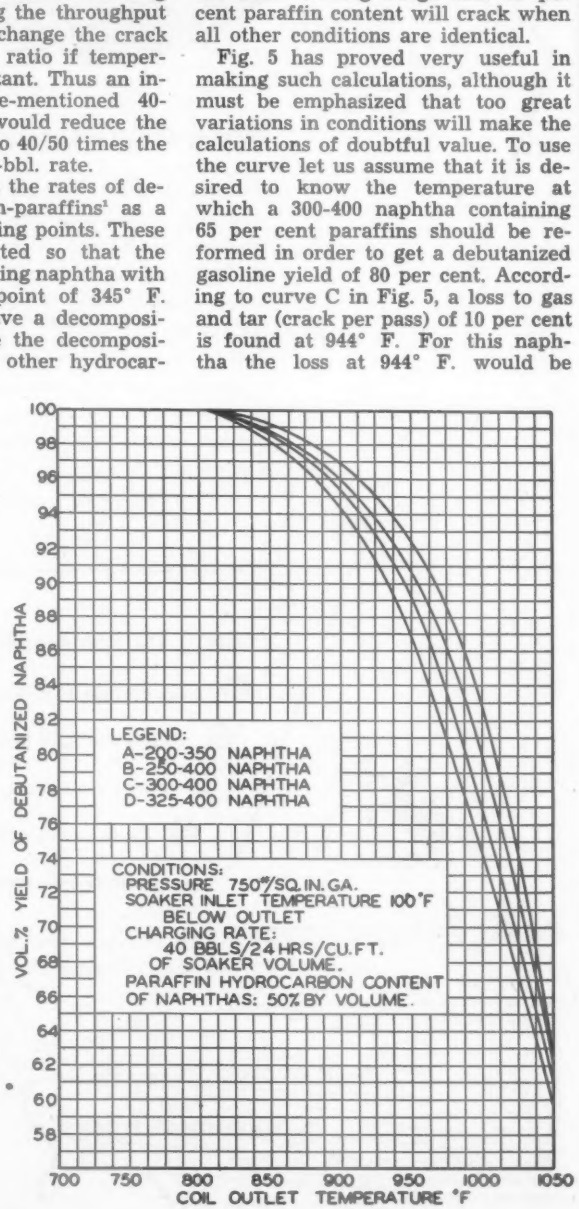


Fig. 4: Rate of decomposition of the n-paraffins

Fig. 5, (right): Reforming Mid-Continent naphthas. Effect of coil outlet temperature and naphtha-type upon gasoline yield



10 × 65/50 = 13 per cent. At 15 per cent loss curve C shows a temperature of 968° F. At this temperature the unknown would lose 15 × 65/50 = 19.5 per cent. At 20 per cent loss curve C indicates a temperature of 990° F. and at this temperature the proposed naphtha would lose 20 × 65/50 = 26 per cent. By interpolation we therefore find this naphtha should be reformed at 970° F. in order to produce 80 per cent of debutanized reformate.

Instead of straight thermal reforming the refiner will study also the possibility of reforming in the presence of recirculated gases, as already mentioned. A number of such processes have been developed and offered to the industry. They all depend upon recirculation through the coil of gases dissolved in the charge or added by means of a separate charging pump. The purpose is, of course, to keep in the cracking coil as much as possible of the gaseous compounds heavier than methane which are produced in the cracking reaction. Much of this gas is polymerized under the temperature and pressure conditions prevailing in the soaking section. By the presence of these compounds it is also probable that formation of further quantities of them may be suppressed. If the radical theory mentioned earlier in this series is sound, such a suppressing effect is certain to exist. Either one or both of these functions of the gas will explain the fact that much higher temperatures can be carried on a coil handling a mixture of gas and naphtha than would be the case for an operation in which naphtha alone is charged. In many cases where insufficient outside gas is available for a separate polymerization coil such extra gas can well be used either in the reforming coil or in the gas oil or vis-breaking coils. The gases from stabilizer reflux accumulators are frequently the cheapest source of desirable gases.

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California Operators Study U.S.G.S. Unit Plan

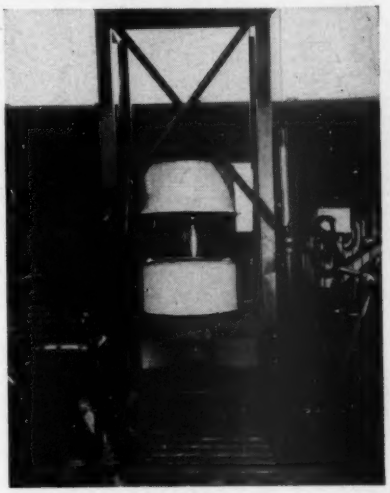
LOS ANGELES, Calif.—A special committee of operating oil men has been appointed by Warner Clark, chairman of the Conservation Committee of California Oil Producers, to study the recently proposed "Regulations for Oil and Gas Unit Plan," which is being sponsored by the U.S.G.S., Department of the Interior.

The committee will formulate and present modifications of the plan in order to solve local oil-field problems.

Double-Deck Barrel Hoist Saves Labor and Speeds Loading

A DOUBLE-DECK barrel hoist for lifting heavy, loaded drums and loading them on top of the first layer in freight cars, in storage, etc., has a frame welded from channels and angles. A 6-in. by 4-ft. pipe is fitted as an air cylinder, with a piston and rod extending through a packing gland; cup leathers make the piston airtight in the cylinder; two wire cables pass over the pulleys and down to the movable platform floored with conveyor rollers and running in the angle-iron flanges as guides. A three-way air valve with a short exhaust pipe is fitted to the upper end of the air cylinder. The frame is equipped with grooved roller supports on a rail next to the roller conveyor and with wheels running on a metal strip opposite, so the hoist can be located at will; the air hose is connected to an air pipe underneath the edge of the floor, with connections at intervals.

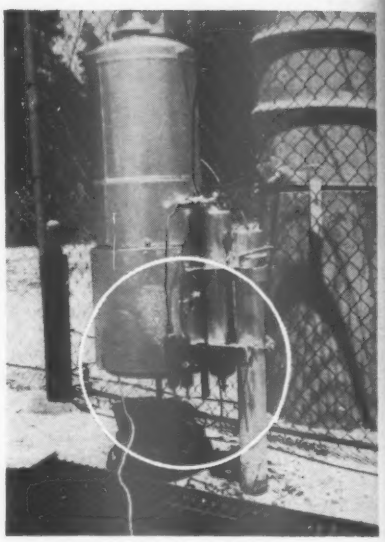
In operation, a drum or barrel is shunted onto the roller-floored platform from the main conveyor by a movable deflector; air is admitted to the cylinder, forcing the piston down and drawing the platform up to the upper level; a roller conveyor extends from this level to the interior of the car, or above the level of the ground tier of drums in a storage space, etc. The drum is rolled from the platform along this conveyor to its position atop the drums on the second level, requiring only one or two men instead of several needed if these drums are lifted to the higher level by hand.



OPERATING IDEAS

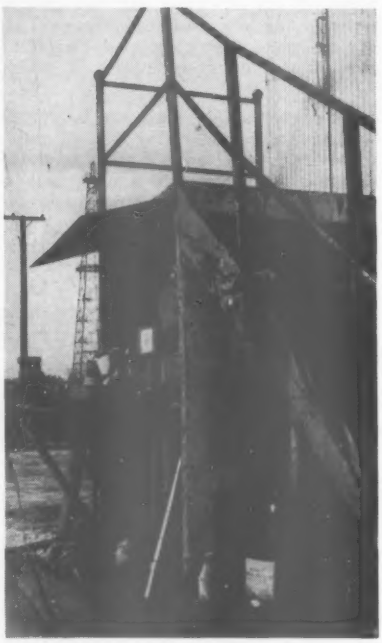
Hinged Work Table At Drilling Rig

A RECEPTACLE for small hand tools as well as a convenient work bench to handle light repairs can be built as part of a steel closet which is located beneath a stair landing at the side of the derrick floor. Tank steel is welded to a frame of junk pipe with the front side in two sections. The upper is attached to hinges to swing upward and outward as a sort of canopy to shed dew and rain. The lower section is hinged likewise, but folds down and out to be supported on "gate" legs of 2-in. pipe and forms the table of the work bench.



Sampling Box Saves Work And Promotes Cleanliness

OBTAINING of samples from a stock tank (thiefing) is a rather messy operation and one which generally results in some oil getting on the tank. This of course must be wiped up by the pumper. Due to the use of vaporproof tanks the practice of sampling has changed and some companies simply draw out a small quantity of oil from the desired levels. By grouping the discharges from these sampling lines into a special box, splattering of the tank with oil is eliminated. A brace attached to the door makes it into a shelf while the sampling is in progress. Any spilled oil falls into the rounded bottom of the sampling box from which it can be drained into the tank.



U-Tube Shows Valve Operation

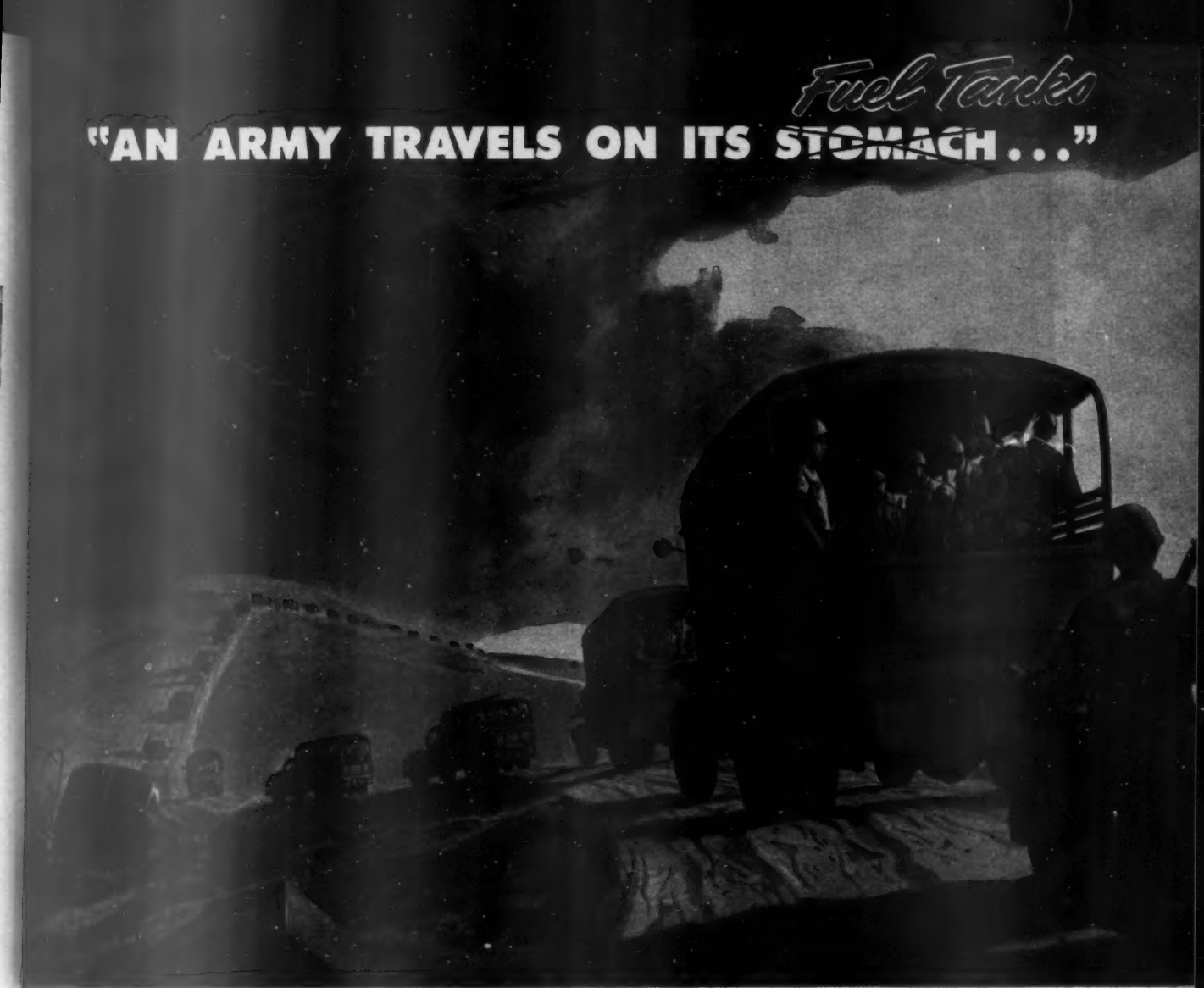
IT is essential that the suction valve in this chemical pump close on each stroke as the pump operates against pressures up to 2,500 lb. per sq. in. The pump is used to inject corrosion-control chemicals in a distillate well in an East Texas field. Valve operation is shown by the U-tube in the suction line at lower front of the pump body. The bottom of the U is filled with mercury and the fluid must pass through it. With each stroke of the pump the mercury rises a little until the chemical being pumped bypasses it. The mercury then falls to the bottom of the U. If the suction valve is not holding, the mercury will rise in the upstream half of the U-tube.

Guard for Holddowns As A Safety Device

USE of holddowns for road crossings, etc., is essential when pumping with a central geared or bandwheel power. Guards around the bottom of the holddowns close to roadsides are employed to prevent injury to children who might have the temptation to "hitch a ride." The guards also prevent large-scale deposition of windblown debris around the holddown. A narrow slot in the top of the guard permits travel back and forth of the holddown.

"AN ARMY TRAVELS ON ITS STOMACH..."

Fuel Tanks



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Not the roaring mistress of the sky with its uncanny bombsight . . . *not* the incredible jeep . . . *not* the tank-blasting "bazooka" . . . *not even* the shining courage of our fighting forces. These are known.

But what of OIL?

Without oil AMERICA'S VICTORY MARCH STOPS DEAD IN ITS TRACKS. Next week, or tomorrow, or *today* . . . *we* stop moving when *oil* stops flowing.

Behold, then, the spectacle of our most potent weapon veiled in relative *secrecy*, through general lassitude or just plain misunderstanding of its vital, basic, tremendous importance!

If this were not so there would be no threat of an oil shortage caused by lack of equipment, tools, pipe, or manpower. There would be no failure, occasioned by inadequate price incentives, to develop new oil reserves to replace fast dwindling known ones. There would be no quibbling delay when the stake is human lives.

Get this straight America! Our armed forces cannot travel on empty fuel tanks. Oil, our mightiest weapon, must not be a *secret* one any longer.

Nothing must stand in the way of an enlightened policy of maximum production with equivalent or better reserve replacement. Adjustment of all factors necessary to achieve this end is the urgent need of the oil producing industry . . . and the nation.

***MOBILITY* is the Force of America**

***...and Mobility depends on* OIL**

PITTSBURGH STEEL COMPANY

Grant Building (P) Pittsburgh, Pa.

SERVING THE PRODUCING AND REFINING INDUSTRIES WITH DRILL PIPE, CASING, OIL WELL TUBING, REFINERY PIPING

This advertisement published in such magazines as FORTUNE, BUSINESS WEEK, IRON AGE, PURCHASING *and* ARMY ORDNANCE.

Layout for A-C Drilling Rig

*by E. H. Lamberger**

POWER for a-c oil-well drilling rigs is commonly supplied by a substation consisting of either one three-phase or three single-phase transformers. At the substation, any convenient supply voltage, usually 2,300 volts, is stepped down to 440 volts for use at the motor terminals. The substation also includes a primary disconnect switch, a primary breaker and metering equipment.

Specifications for a-c drilling equipment for wells to different depths are presented in tabular form in this article together with a plan-view layout of a complete a-c variable voltage drilling rig.

The substation may be furnished completely by the utility and power metered on the 440-volt side of the transformers. Or, the utility may meter the power at high voltage and make the substation the responsibility of the drilling company. In this case, it is often found convenient to mount the substation permanently on a trailer for ease of moving and setting up at new locations.

*Industry engineer, petroleum section, Westinghouse Electric & Manufacturing Co.

TABLE 1—TYPICAL A-C DRIVE, MOTORS AND CONTROL FOR DRILLING DEPTHS OF 5,000, 10,000 AND 15,000 FT.

Equipment	Well depth 5,000 ft.	10,000 ft.	15,000 ft.
Transformer capacity	600 kv-a	750 kv-a	1,000 kv-a
Drawworks drive			
Motor			
Hp. rating at 900 r.p.m.	1-250 or 2-125	1-400 or 2-200	1-600 or 2-300
Type frame	Splashproof	Splashproof	Splashproof
Drilling gear—single reduction helical type	Single or twin pinion		
Over-all dimensions, motor, gear unit, bed plate (in.)	Length 150, width 89, height 51	Length 120, width 95, height 70	Length 135, width 105, height 70
Total weight (lb.)	16,000	24,000	28,000
Table drive			
Motor—single			
Hp. rating at 900 r.p.m.	Table driven from draw-works	250	400
Type frame		Splashproof	Splashproof
Gear unit		Two-speed	Two-speed
Over-all dimensions (in.)		Length 112, width 47, height 54	Length 147, width 70, height 74
Total weight (lb.)		9,500	16,000
Mud pump motors			
Main mud pump motor			
Hp. rating at 900 r.p.m.	1-300	1-400	1-400 or 2-400
Type frame	Splashproof	Splashproof	Splashproof
Over-all dimensions (in.)	Length 81, width 63, height 50	Length 102, width 72, height 66	Length 102, width 72, height 66
Total weight (each)	5,400	10,000	10,000
Auxiliary mud pump motor			
Hp. rating at 900 r.p.m.	1-150	1-200	1-200
Type frame	Splashproof	Splashproof	Splashproof
Over-all dimensions (in.)	Length 90, width 50, height 42	Length 90, width 50, height 42	Length 92, width 50, height 42
Total weight (lb.) each	3,800	4,000	4,000
Control			
Drawworks motor control, type	Magnetic air break	Magnetic air break (forced ventilated)	Magnetic air break (forced ventilated)
Over-all dimensions (in.)	Length 110, width 90, height 80	Length 110, width 80, height 90	Length 120, width 80, height 90
Total weight (lb.)	6,000	6,300	6,500
Table motor control, type	Table driven from draw-works	Magnetic air break	Magnetic air break (forced ventilated)
Over-all dimensions (in.)		Length 96, width 90, height 80	Length 110, width 80, height 80
Total weight (lb.)		6,000	6,000
Main mud pump motor control, type	Manual oil-immersed drum	Magnetic air break (forced ventilated)	Magnetic air break (forced ventilated)
Over-all dimensions (in.)	Length 76, width 88, height 75	Length 87, width 92, height 84	Length 87, width 92, height 84
Total weight (lb.)	4,500	5,200	5,200
Aux. mud pump motor control type	Manual oil-immersed drum	Manual oil-immersed drum	Manual oil-immersed drum
Over-all dimensions (in.)	Length 71, width 61, height 75	Length 71, width 61, height 75	Length 71, width 61, height 75
Total weight (lb.)	2,800	3,000	3,000
Other control apparatus	For drum control:	Sheave type draw-works post-hand wheel.	
	For magnetic control:	Oil-immersed master controller with draw-works post-hand wheel.	
	For all types 1:	Emergency stop explosion-proof push button. Ammeter for each main motor. Linestart breakers for auxiliary motors. Dry-type transformers used for no-volt lighting.	

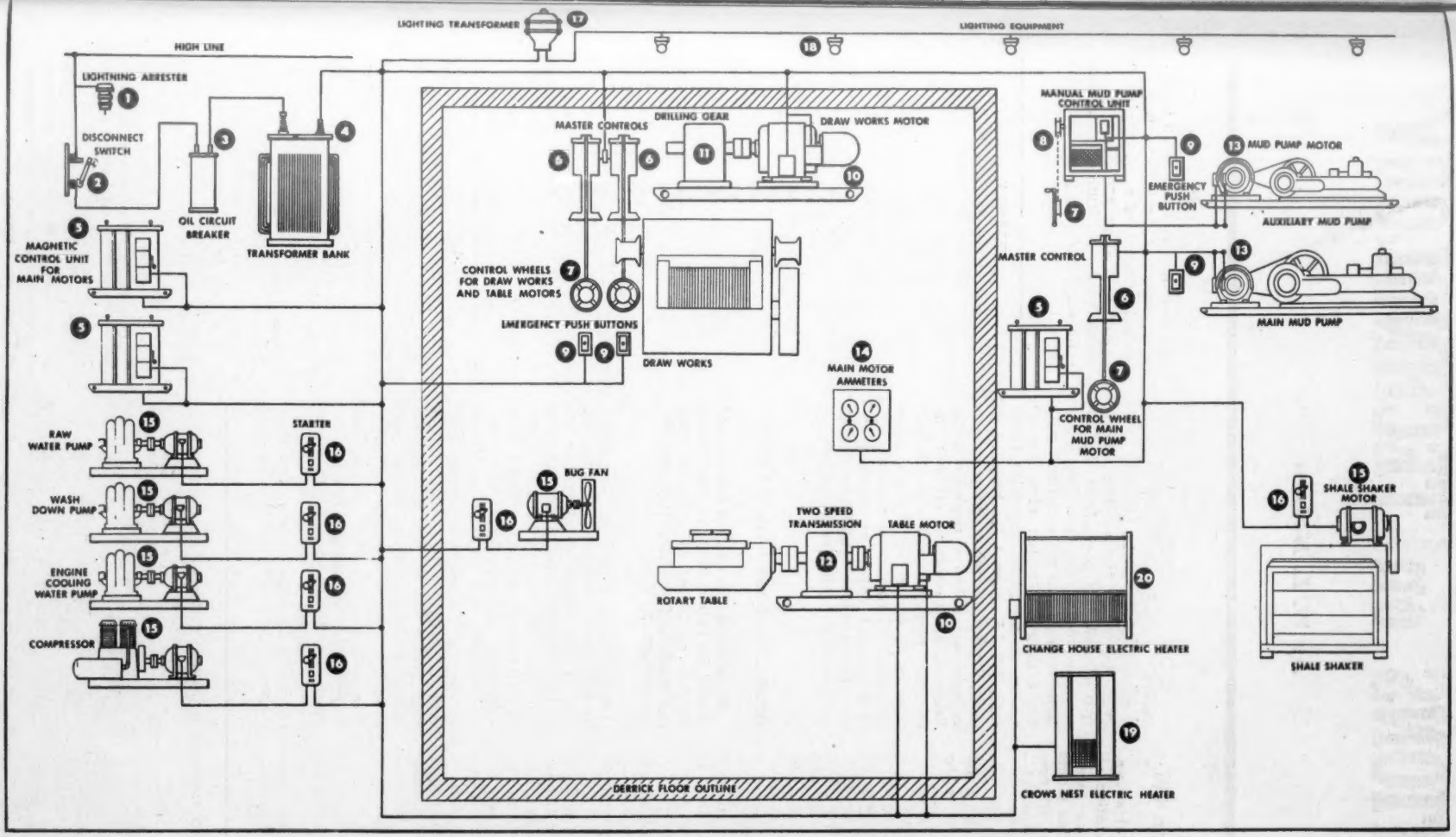

Fig. 1: Plan-view layout of complete alternating-current, variable-voltage drilling rig

DIAGRAM IDENTIFICATION

1.—Lightning arrester protects against high voltage surges from the high line.

2.—Disconnect switch for positive "killing" of all primary and secondary apparatus.

3.—Oil circuit breaker, manually closed, remotely opened, for emergency stopping of all drives from driller's position, and for short circuit protection.

4.—Transformer bank may be either single-phase units or a single three-phase unit.

5.—Main control unit, magnetic air-break type, with primary and secondary contactors and relays, and speed regulation resistors.

6.—Oil-immersed master controllers for controlling speed and direction of rotation of main motors.

7.—Driller's control wheels for operating master controllers.

8.—Manually-operated control unit with oil-immersed drum and speed regulating resistors, for mud pump motors up to 350 hp. Magnetic control is used for higher ratings.

9.—Explosion-proof emergency stop push buttons by which the motor circuit is instantly opened.

10.—Drawworks and table motors, wound rotor type, splashproof construction, have collector rings enclosed in explosion-resisting housing. Drawworks drive may be single or twin motor.

11.—Drilling gear with single reduction helical gearing. Motor and gear unit mounted on skid-type bedplate.

12.—Two-speed transmission for table drive, with single helical gearing. Motor and gear unit coupled and mounted on skid-type base. (Construction suitable for mounting motor and gear unit in cellar with overhung chain drive to table.)

13.—Mud pump motors, wound rotor type, splashproof construction, with collector rings enclosed in explosion-resisting housing.

14.—Ammeters for main motors.

15.—Auxiliary motors for driving fans, pumps, compressors, shale shakers and similar auxiliary units may be of dripproof, splashproof or explosion-proof construction.

16.—Auxiliary motor starters, across-the-line type, may be enclosed in dust-tight, weather-proof or explosion-proof cases.

17.—Dry-type weather-proof transformers, which may be hung in the derrick, provide convenient power supply for lighting.

18.—Lighting equipment.

19.—Electric heater for crow's nest.

20.—Electric heater for change house arranged for drying clothes and warming food.

QUESTIONS on TECHNOLOGY

by W. L. Nelson

Low-Boiling Absorption Oil

Can you give the technical advantage of using a lighter absorption oil medium 300 to 400 distillation range in the present modern gasoline plants over the older mineral seal oil previously used for such purposes?—L. S. W.

The advantage of a low-boiling absorption oil over a higher one is the relatively low molecular weight of the low-boiling oil.

A somewhat complete discussion of the theory of absorption is given on pages 556-564 of Petroleum Refinery Engineering (McGraw-Hill Book Co., Inc.) but for this discussion it will suffice to indicate that the gallons of oil that must be recirculated in order to absorb a desired percentage of a component from a gas is directly proportional to the molecular weight of the oil and inversely proportional to the specific gravity of the oil, thus:

$$\text{Gallons recirculated} = C \frac{\text{Mol. weight}}{\text{Specific gr.}}$$

A low-molecular-weight and a high-specific-gravity oil would be ideal. Inasmuch as low-mole-weight oils have somewhat low densities, the two factors work against one another, but the low-mole-weight oils are somewhat superior. The situation can be judged by tabulating the ratio of mole weight to specific gravity, the smaller this ratio the greater the effectiveness of the oil. Such a tabulation is shown in Table 1.

Thus, from the standpoint of absorption effectiveness, low-boiling asphalt (or naphthene) base oils are the most effective ones—more than twice as much 650° F. paraffin base oil as 350° F. naphthene oil, is required.

Such a consideration is not, however, the entire picture. The separation of absorbed gases from the absorption oil in the gasoline plant stripper or still, is more difficult with low-boiling absorption oils. An oil having an initial boiling point lower than 350° F. cannot be handled in most plants, although many petroleum refiners use a heavy naphtha (gasoline) as an absorption oil and the enriched naphtha so obtained is sold directly as motor fuel. Finally, some of asphalt or naphthene-base absorption oils may not be as stable as the paraffin-base oils, tending to darken and thicken during recirculation.

TABLE 1—EFFECTIVENESS OF ABSORPTION OILS

Boiling range (°F.)	Pennsylvania oils		Asphalt base oils		Gallons oil required based on 300°-400° F. asphalt base oil	
	Mol. wt.	Sp. gr.	Mol. wt.	Sp. gr.	Penn. oils	Asphalt oils
300-400	148	0.769	138	0.837	117	100
400-500	191	0.797	180	0.871	145	125
500-600	246	0.825	223	0.898	181	151
600-700	303	0.855	274	0.926	214	179

Aromatic Base Crude Oils

Some crude oils contain toluene and should be called aromatic crude oils. Why is no listing of aromatic base oils made in Petroleum Refinery Engineering?—A. V. S.

Aromatic hydrocarbons are found in such small amounts in most crude oils of the United States that the Bureau of Mines and other authoritative agencies have not felt it necessary to make a separate classification known as aromatic base. The quest for benzene and toluene in United States oils is a common one, as indicated by the questions answered on page 197 of The Oil and Gas Journal of September 19, 1940, as well as page 88 of the issue of May 23, 1940.

In other areas than the United States, notably Burmah, Borneo and Persia, crude oils are found which contain relatively large amounts of the lower-boiling aromatics (benzene, toluene, and the xylenes) as well as large amounts of aromatics in higher-boiling fractions. An indication of the aromatic content of some crude oils is given by Garner and Evans in the Journal of the Institute of Petroleum Technology, Vol. 18, page 751, 1932. (Table 1.)

TABLE 1

Aromatic Hydrocarbons in Gasoline
(Per cent by weight)

	Gaso. yield	Ben-zene	Tolu-ene	Xyl-enes	Total aromatics up to 150°C.
Powel	16	0.4	1.2	2.9	4.5
Reagan	35	0.1	0.2	1.5	1.8
Seminole	36	0.1	0.6	1.5	2.2
Californian	20	0.6	2.4	3.7	6.7
Hvy. Smackover	..	0.15	0.4	1.5	2.05
Mexia	..	5.0	8.0	4.5	17.5
Mexican	10	0.5	1.5	3.0	5.0
Venezuelan	7	0.9	1.5	3.7	6.1
Colombian	20	0.2	0.8	1.3	2.3
Hardstoft (England)	4	0.15	0.5	1.3	1.95
Grosny	13	0.4	1.4	2.0	3.8
Peruvian	20	0.3	1.6	2.5	4.4
Panuco	3	0.7	1.9	4.0	6.6
Persian	30	1.5	4.5	5.1	11.1
Rumanian	..	1.8	3.6	4.2	9.6
Baku	..	0.04	0.8	0.6	1.44
Borneo	..	7.0	14.0	15.0	36.0
Miri	..	0.4	1.9	1.5	3.8
Burmah	..	2.9	6.0	6.8	15.7
Badapur	..	1.0	1.6	2.9	5.5

The tabulation indicates that most United States crude oils are low in aromatic hydrocarbons, although a few of the crude oils that we have classed as naphthenic are fairly rich in aromatics. Other crude oils that contain notable amounts of aromatics are Ventura, Coalinga and Puento Hills of California, and Maljamar of New Mexico.

In most instances the percentages of aromatic hydrocarbons are not large enough to justify the name aromatic base crude oil. The importance, however, of the valuable antiknock properties of the aromatic hydrocarbons is so great that perhaps the use of the name aromatic base is properly indicative of these oils. Such a usage is not more misleading than the names paraffin base and naphthene base because both of these oils consist mainly of naphthene hydrocarbons.

Oil-Well Pumping Practices—No. 17

Surface Pumping Equipment —PRIME MOVERS

by J. Zaba

In this installment the author continues his discussion of surface pumping equipment which began in the issue of October 14. The series as a whole began in the issue of July 1, and is so organized that each installment is a unit in itself which may be read without having to refer to previous installments.

IN dealing with the surface pumping equipment of a unit pumping installation the preceding chapters of this series discussed the equipment from the beam hanger to the crank and the reduction unit. There remains for consideration the last element of the surface equipment, the prime mover, which supplies the power to the installation. Before proceeding with actual discussion of prime movers it is necessary, first, to consider the power requirements of a pumping installation, since power requirement is the factor which determines selection of the prime mover.

It should be realized that the only useful work performed by the prime mover is that of lifting the weight of the produced oil from the working fluid level to the surface. This work requires only a small portion of power needed for operation of the installation. The rest of the power is used in overcoming internal resistance of the whole system, from prime mover to the sucker-rod pump.

The brake horsepower of the prime mover is delivered to the polished rod as the so-called polished-rod horsepower, decreased in magnitude by the internal friction of the surface pumping equipment. This loss of power does not have a great effect on the over-all efficiency of the installation since the efficiency of the modern surface equipment is rather high. Not all of the polished-rod horsepower, however, is utilized in lifting the fluid since the subsurface power losses are considerable. The power used in actually lifting the fluid is expressed in the so-called hydraulic horsepower. The ratio of the hydraulic horsepower to the polished-rod horsepower is called the lift efficiency. The generally low-lift efficiency results in low over-all efficiency of the sucker-rod pumping installations.

The hydraulic horsepower, the polished-rod horsepower and the efficiencies are discussed here beginning with the sucker-rod pump of the system.

Hydraulic horsepower.—Since work is product of weight and distance the power necessary to perform the work of lifting the fluid can be expressed as follows:

$$Hp_{hydr} = \frac{Q \times W \times L}{33{,}000 \times 24 \times 60}$$

$$= \frac{Q \times W \times L}{33{,}000 \times 1{,}440} \qquad (1)$$

where

Hp_{hydr} = hydraulic horsepower
Q = barrels of fluid in 24 hours
W = weight of barrel of fluid, pounds
L = lift, feet

The lift, which is the distance from the surface to the pumping fluid level, can be either measured or calculated. Measurements can be made by use of any of the available fluid-level determination methods. Calculations can be made from data on the producing bottom-hole pressure or from information on well's static bottom-hole pressure and productivity index factor.[1] The relation between producing bottom-hole pressure and corresponding fluid level can be written as follows:

$$P_{pr} = H \times \frac{1}{144} \times 62.4 \times S \qquad (2)$$

Or

$$H = \frac{2.31 \times P_{pr}}{S} \qquad (3)$$

Where

H = feet of fluid in hole
P_{pr} = producing bottom-hole pressure, lb. per sq. in.
S = specific gravity of fluid
62.4 = approximate weight of 1 cu. ft. of water

The lift equals total depth of the well less the feet of fluid in the well:

$$L = D - H = D - \frac{2.31 \times P_{pr}}{S} \qquad (4)$$

Where

L = lift in feet
D = total depth of well in feet

and other symbols as in Formula 3.

To arrive at relation between lift and static bottom-hole pressure equation may be used which states that rate of flow of a well is proportional to the differential pressure (Installment 2):

$$Q = C\,(P_{st} - P_{pr}) \qquad (5)$$

Where

Q = production, barrels per day
C = productivity-index factor
P_{st} = static bottom-hole pressure, lb. per sq. in.
P_{pr} = producing bottom-hole pressure, lb. per sq. in.

Solving for P_{pr} and substituting in Equation 4, the expression for lift can be written

$$L = D - \frac{2.31}{S}\left(P_{st} - \frac{Q}{C}\right) \qquad (6)$$

In calculating hydraulic horsepower it is customary to assume that the fluid level is located at the pump. The lift therefore is the full distance between pumping depth and surface. Another usual assumption is lack of gas which would help in lifting of oil. Calculations which consider lifting power supplied by the expanding gas are quite involved.[2,3] Investigation of a large number of installations indicates that efficiency of utilization of the gas-lifting power is rather low, probably around 10 per cent.[3] Even with this low efficiency, however, the aid of gas in lifting oil is considerable and in many cases may have a very decided effect on the power requirements of the pumping installation.

The work performed at the sucker-rod pump and the horsepower required can be determined from oil-well pump dynagraph cards.[4]

Polished-rod horsepower. — Power applied to the sucker rods at the polished rod is expressed in the polished-rod horsepower and is the power actually delivered by the prime mover less the internal friction of the surface pumping equipment.

The area of a polished-rod dynamometer card represents, in foot-pounds, the energy delivered to the rods and the formula for calculating the polished-rod horsepower from a dynamometer card can be written as follows:

$$Hp_{pr} = \frac{A \times S \times N \times C}{L \times 12 \times 33{,}000}$$

Where

Hp_{pr} = polished-rod horsepower
A = area of card, square inches
S = polished-rod stroke, inches
N = strokes per minute
C = calibration constant, lb. per inch of card height
L = length of card, inches

Lifting efficiency. — The power delivered to the polished rod is transmitted by the sucker rods to the pump. During the process of transmission considerable power is lost so that only a portion of the power originally delivered to the polished rod is converted into useful work of lifting the fluid. As previously stated, the ratio of hydraulic horsepower to the polished-rod horsepower is called lifting efficiency.

Consideration of many factors which cause the loss of power between polished rod and pump makes it apparent that the lift efficiencies will vary widely from well to well and in any one given well as the conditions change during the pumping life of the well. Of these factors, the most obvious cause of loss of power is the friction in rods and in the pump. The magnitude of this loss depends on well and fluid characteristics and on the state of repair of the subsurface equipment. Other losses include power needed to overcome loads other than the fluid load, such as vibrational shock, impulse and others. These loads depend on characteristics of the pumping cycle, on state of repair of the surface equipment and other factors. Since all these factors affect the power requirements at the polished rod and since the hydraulic horsepower is the function of the amount of fluid lifted and of lift the relation between pumping depth and lift will affect the lifting efficiency. For a given pumping depth the lifting efficiency will decrease with lift since, with constant pumping depth the friction, affecting the polished-rod horsepower, remains constant, while the hydraulic horsepower decreases with decreasing lift.[1]

Data have been presented on tests on a large number of pumping installations which permit calculation of lifting efficiencies of these installations.[5] The results of these calculations support the statement in regard to wide variation of lift efficiencies. The average of these data is around 50 per cent and while it is difficult to make in such a case any general statement, even on basis of a very large number of tests, the figure of 50 per cent appears to be reasonable as an approximate average for lifting efficiency.[1 6]

Since the work at the pump is expressed by the area of the oil-well dynagraph card and the work at the polished rod by the area of the dynamometer card the ratio of the two areas represents the lift efficiency of the installation.

Surface efficiency. — The efficiency of the surface pumping equipment of a sucker-rod pumping installation is the ratio of the polished-rod horsepower to the brake horsepower of the prime mover. The brake horsepower represents the actual, useful, work which can be secured from the prime mover.

The efficiency of the modern equipment, from prime mover to the polished rod, is high and averages probably over 80 per cent. Of course, cases may occur when this efficiency is much lower as, for instance, in the case of heavy surface equipment handling light loads. The losses in surface equipment are those occurring in the transmission and in the pumping unit itself.

Over-all efficiency. — Assuming 80 per cent as the surface efficiency and 50 per cent as the lift efficiency, the over-all efficiency of a pumping installation would be 40 per cent. This over-all efficiency, from the prime mover to the pump, is of course only an average. Previous discussion of factors which affect the lift efficiency makes it apparent that a wide range of variations of the over-all efficiency is to be expected.

Tests were made on over 200 wells on different leases in Oklahoma and Kansas to determine the over-all efficiency of unit pumping installations powered with electric motors.[7] As used in these tests, the over-all efficiency meant efficiency from electric power meter to fluid in tanks. This concept of over-all efficiency includes of course losses which are not covered by the definition given above (efficiency from prime mover to the polished rod). It is to be expected, therefore, that this efficiency would be lower than the 40 per cent average suggested above.

The results of the tests showed that the over-all efficiency ranged from 35.4 per cent for group of wells with weighted average depth of 2,600 ft. to 27 per cent for group of wells with weighted average depth of 6,430 ft.

Calculations of Power Requirements

On existing installations power, requirements can be determined from dynamometer cards assuming certain efficiency for the surface pumping equipment. On new installations, however, calculations have to be resorted to.

The starting point of such calculations can be Formula 1 for the hydraulic horsepower required. Then assuming 40 per cent as over-all efficiency the brake horsepower requirements of the prime mover can be determined.

An empirical formula may be used for power necessary for overcoming friction of the subsurface system.[8] This formula can be written as follows:

$$HP_f = \frac{\frac{1}{8} W_r + 25 \times N}{33{,}000} \qquad (7)$$

Where

HP_f = power to overcome subsurface friction
W_r = weight of rods, pounds
S = length of polished-rod stroke in feet
N = number of strokes per minute

Power calculated with this formula added to the hydraulic horsepower as calculated from Formula 1 would give approximate polished-rod horsepower requirement. By assuming surface efficiency, brake horsepower requirements would be arrived at.

It should be emphasized again that calculations given above are only an approximation. While on the average fairly satisfactory results may be obtained from use of these formulas in certain instances, because of assumptions which have to be made, the calculations may lead to considerable errors.

A formula has been developed which bases the calculation of pumping-power requirements on approximate relation between the area of dynamometer card and the loads involved. The advantage of such a formula lies in the fact that it eliminates theoretical assumptions needed when using the formulas previously given. The only assumption made, when using this formula, is the validity of the relation, which has been evolved from the study of a large number of dynamometer cards. The results of use of this formula, giving the area of dynamometer card, that is the polished-rod horsepower, are equivalent to calculations from actual card.

The relation between loads and area has been found to be different for slow and for fast speeds of pumping. For speeds of 10 s.p.m. or less the card area is approximately the product of the difference between peak load and dead load and length of stroke. For speeds above 10 s.p.m. a factor has to be introduced for forces necessary for acceleration and the formula can be written

$$Hp_{pr} = \frac{W_f \times S \times N \left(1 + \frac{b^2(S/2)}{g}\right)}{396{,}000} \qquad (8)$$

Where

Hp_{pr} = horsepower at polished rod
W_f = static fluid load = plunger area × feet of lift × hydrostatic pressure per foot of fluid
S = length of stroke, inches
N = strokes per minute
b = angular velocity in radians per second
g = gravitational constant, inches per second per second

Table for values of expression $\left(1 + \frac{b^2(S/2)}{g}\right)$

for different combinations of speeds of pumping and lengths of stroke has been published in Installment 8 of this series, s in this table corresponding to S/2 in Formula 8.

In calculating the power requirements of a new installation, the whole pumping life of a well has to be considered. At the later stages of production decreasing fluid levels, lack of gas, and increase in water content leads toward increase in power requirements. Actually, therefore, any calculation for selection of prime mover should consider the extreme case of dead load lift from the total depth of well, the weight of fluid being equal that of water. In many cases, of course, original selection of prime mover, fulfilling such requirements, would lead to inefficient operation in the early stages of production. Weighing of different economic factors involved may suggest, in such cases, original installation of lighter equipment, with later change to heavier equipment when power requirements of well increase.

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Rebuilding Tubes and Tube Headers

STILL tubes, especially those used in high-pressure, high-temperature cracking stills, are both difficult and expensive to replace, now that steel is at such a high premium and deliveries are of necessity so slow. This is particularly true of alloy steels, the higher the alloy the greater difficulty encountered. Most commonly the tubes used in cracking stills are the so-called "4-6 chrome-moly." Damage to the tubes occurs mainly within the first 12-18 in. at the ends, where the hot, rapidly flowing liquid-vapor mixture is changing direction rapidly. Erosion-corrosion in the main body of the tube wall is generally a small fraction of that at the ends. Similarly the throat of tube headers receives the most punishment and will be cut out, by erosion, mainly, long before the remainder of the header is affected appreciably.

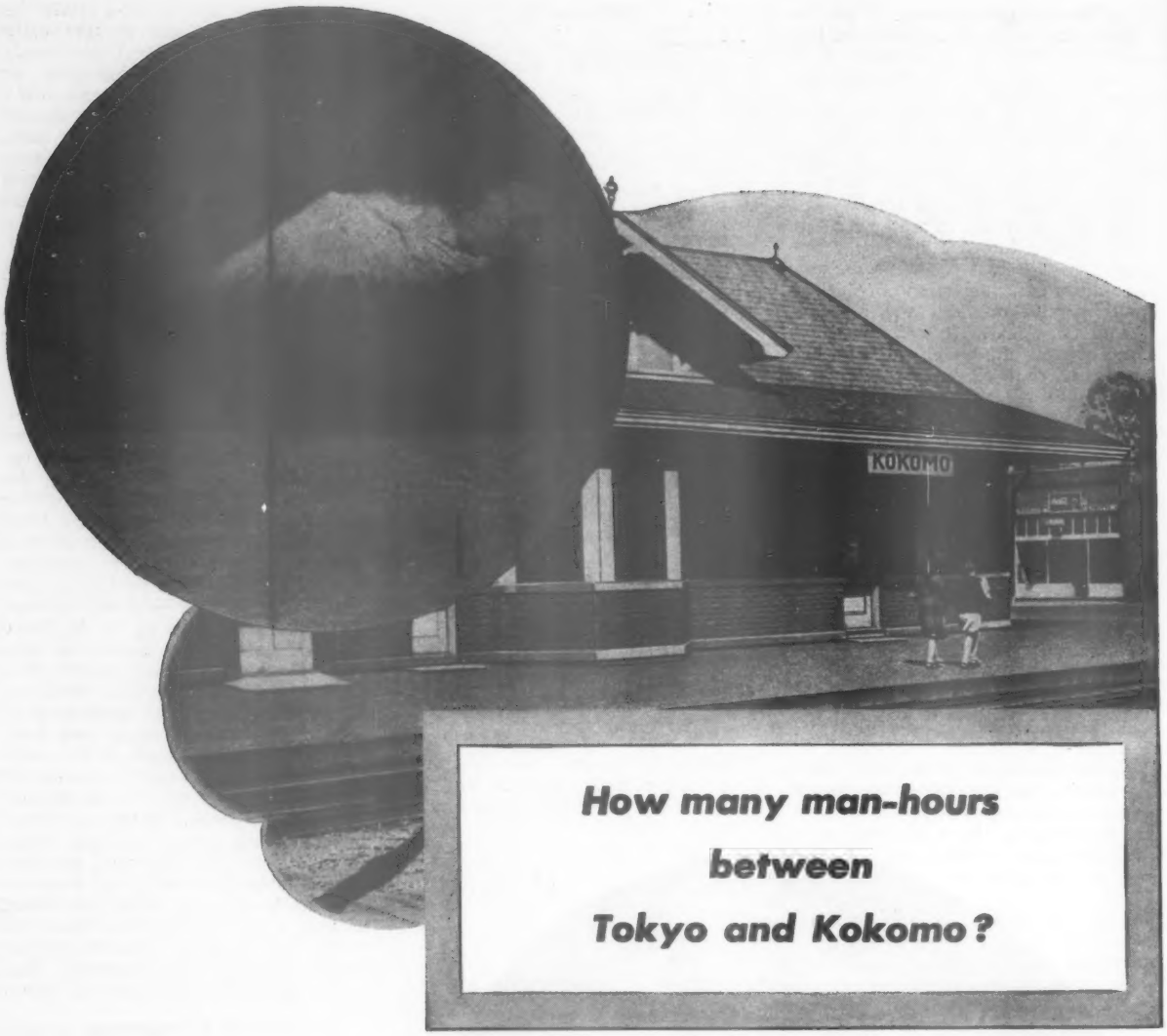
Next-to-last step in repairing a cracking-coil tube: welding on new end

Simple and Effective

The methods employed by Gulf Refining Co. to reclaim these tubes and headers are simple and effective, usable by any company possessing the services of a welder and welding equipment. The headers are cut from the tubes and the nipples left in them may be removed by such means as that given for recovering flanges. The eroded throats are built up oversize by welding, using rods of the same alloy as that of the header or of a more noble composition, never of a lower alloy composition. Oversize metal is cut away by machining to restore the smooth curve and contour of the inside surface of the header. In some cases it may be necessary to machine away part of the header inner surface where tubes are fitted and build up again, cut new shear rings or points. In this case, the procedure is simple: build up oversize in a uniform layer after machining to give a smooth base on which to weld. Cut back to dimensions by machining, cut new grooves into which tubes will be rolled or upset.

Method of Procedure

Used tubes are calipered and the thinned ends are cut off. Generally this section cut off is from 12 to 24 in. long; cracking-still tubes of 4 in. i.d. are generally of ½-in. wall when new. Sections of new or of good used tubes approximately equal in length to that cut off are beveled on the welding end, as is the cut-off end of the main body of the tube being repaired. These two beveled edges are fitted together and welded carefully using rod of the same or higher alloy composition as that of the tube. The joint is built up oversize; the tube is straightened, the overlayer of steel machined off so the tube will slip through tube sheets and supports, and the tube is cut off to exact length and its ends fitted to individual headers, frequently rebuilt headers. To avoid undesirable turbulence and undue erosion inside the mended tube a special grinder is used to remove all burrs inside the weld and to make a smooth, flush inner surface. Electric welding is used widely, although oxy-acetylene may be used satisfactorily.



How many man-hours between Tokyo and Kokomo?

RIGHT now you're producing things for Tokyo . . . things that Tokyo may not want, but which it is surely going to get.

We hope it won't be too long until the last Jap battleship is sunk—and then you'll want to get back to producing things for Kokomo—and Kankakee and Omaha and Centerville.

How many man-hours lie between Tokyo and Kokomo? How long will it take to switch from war production to the new products you will need to compete for the peacetime markets?

One sure way to shorten the lag is to learn all you can *now* about the important new materials. That's why we urge you to experiment now with Hycar synthetic rubber, test it, know the real value of a material in which oil-swell can be positively controlled, with an operating range of −65° to 250°F, with abrasion resistance 50% better than natural rubber, and always with excellent compression-set characteristics.

These are just the qualities that engineers have sought for years for oil and fuel hose, motor mounts, vibration dampeners, gaskets, seals, packing, and hosts of other products. They are the qualities with which you should be familiar, if you're going to be ready for peace. *Hycar Chemical Co., Akron 8, Ohio.*

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Because of Hycar's outstanding performance in war uses the demand far exceeds the supply. However, limited quantities are available for experimental work so that your supplier of rubber products may obtain small amounts to permit you to make tests in your own applications, both present and future. It's to your advantage to gain experience now against the day you will need new and even better resilient products. Our technical staff and laboratory are ready to help.

COST ANALYSIS—MARGINAL WELLS

OPERATION of marginal wells is one of the most frequent and perplexing problems encountered by the oil operator. Many of these wells may be operating at a loss, and determination of the well status depends to a large extent upon a careful cost analysis.

Such an analysis depends not only upon accounting records but also upon sound judgment exercised by the analyst. Many of the expense items charged against the well would remain unaffected if the well were abandoned. Such items include overhead, supervisory costs, and, usually, water-disposal costs and pumper's wages. As a general rule these costs are not considered since they cannot be eliminated by abandoning one well.

Expense items which can be eliminated by discontinuing operation of the well in question are usually classed under the heading of "eliminable expense." These items include all direct repairs on the well equipment, and operating charges such as fuel, lubricating oil, etc., which are affected by the well operation.

The pumper's salary is never classed as eliminable expense unless abandonment of the well would result in an actual reduction in pumper expense. In most instances this expense would merely be prorated among other wells on the lease or general area.

Example of Cost Analysis

A cost analysis in its simplest form is illustrated in Table 1. The production curve for this well is shown in the accompanying figure. In June 1943 the well was producing only 2.4 bbl. of oil per day with some 200 bbl. of water. The value of the estimated net oil which would be produced during 1943 was $785. The estimated expense (based on expense records for the three previous years) which could be eliminated by discontinuing operation of the well, amounted to $1,448 for the year. Thus the anticipated loss for 1943 was estimated to be $663.

The eliminable expense as shown in the table included surface and subsurface repairs. The well equipment included a 40-hp. engine operating on purchased natural gas as fuel. The estimated fuel cost, based on 12½ cents per 1,000 cu. ft. and 15 cu. ft. per brake horsepower hour gas consumption amounted to $552. Down time was also taken into consideration when the fuel cost was calculated. Other direct operating charges such as lubricating oil, waste, etc., were insignificant and were not considered in the cost analysis.

Since the well was connected to a salt-water disposal system with more or less fixed operating charges, no reduction in expense was anticipated by discontinuing operation of the well.

It will be noted that the major items of expense were sucker rods, pump and tubing. As a general rule, after such a cost analysis has been completed, all means for reduction of repair expense are thoroughly investigated. In the present example consideration might be given to operating the well at a slower cycle and longer stroke. In many instances this procedure reduces sucker-rod stresses and thus eliminate some of the rod failures.

In normal periods if the well in question continued to operate at a loss it would be abandoned. However, well abandonments at the present time are subject to federal regulations.

TABLE 1

Production

	Gross oil	Net oil	Value net oil
1939	5,450	4,760	$5,240
1940	3,060	2,680	2,945
1941	2,010	1,760	1,935
1942	1,190	1,040	1,142

Repair Expense

	Surface	Subsurface	Total
1939	$125	$279	$404
1940	269	493	762
1941	246	681	927
1942	220	779	999
1943 (6 mo.)	136	262	398

Eliminable Expense

(On basis of previous 3 years)

Surface repair expense:	
Engine	$126
Lead line	133
Subsurface repair expense:	
Pump	154
Sucker rods	204
Tubing	223
Miscellaneous repairs	56
Total repair expense	$896
Operating:	
Fuel gas	$552
Total eliminable expense	$1,448
Estimated loss for 1943	$663

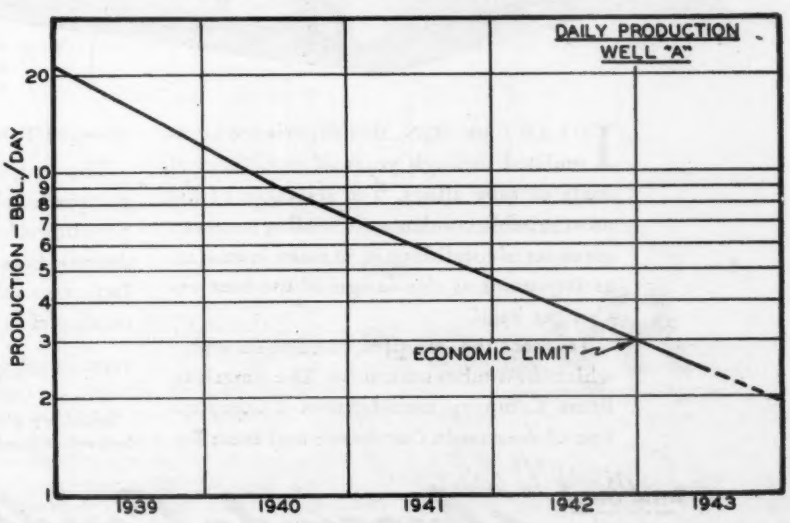

Fig. 1

Important as the design— is the METALLURGICAL experience behind the tubes

● 42 Braun Open Type Coolers and Condensers equipped with Anaconda Tubes ready for shipment to a Western oil refinery.

IT CAN'T BE SEEN, this experience accumulated through years of metallurgical study of tube alloys. Yet, selection of the most suitable condenser tube alloy to meet a given set of conditions is, in many instances, as important as the design of the heat exchanger itself.

To meet the complex conditions under which these tubes must serve, The American Brass Company manufactures a complete line of Anaconda Condenser and Heat Exchanger Tubes in a wide variety of alloys.

The cooperation of our Engineers, plus comprehensive performance records of copper alloy tubes under a broad range of conditions, have helped both users and manufacturers of this type of equipment to obtain maximum value.

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Anaconda Condenser Tubes

BUY ALL THE WAR BONDS YOU CAN AFFORD

Journalog

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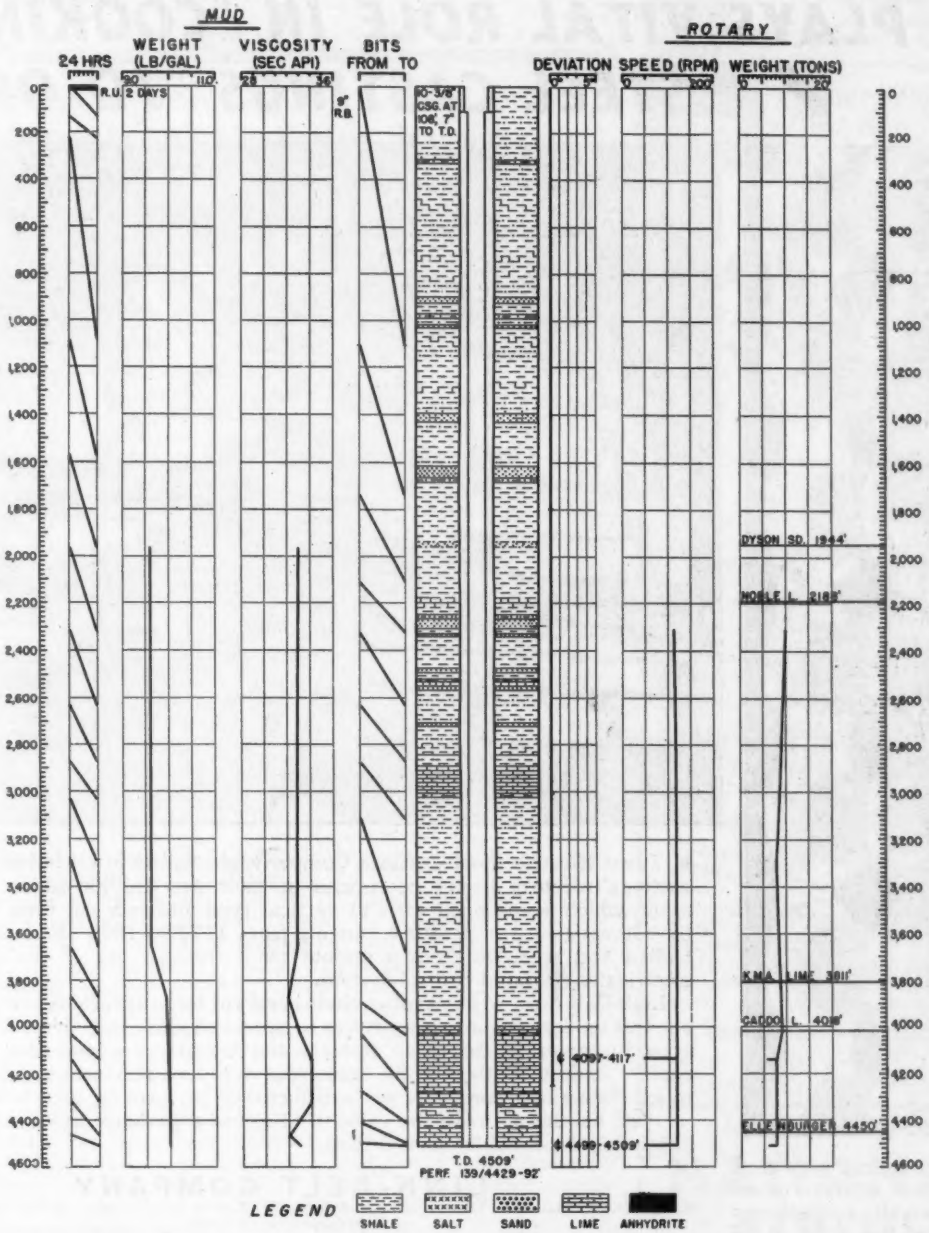
W. T. WAGGONER, EST., MM-1 FEE
NE NE Sec. 8, Blk. 17, H.&T.C.R.R. Sur.

CONTRACTOR
Frank Wood



DRILLING DATA

Well elevation (ground)	1,172 ft.
Date started rigging up	7- 6-43
Date started drilling rotary	7- 8-43
Date set casing rotary	7-25-43
Total rotary time	17 days
W.O.C.	29 hr.
Trips	16

CASING AND TUBING RECORD

Size (in.)	Weight (lb.)	Depth (ft.)	Cement (sacks)
10¾	32.75	107'9"	50
7	20	4,509	250

BITS USED

Type	Number	Size
Rock bit	14	9-in.

CORE HEADS USED

Type	Number	Size
Hard	1	6⅝-in.
Hard	1	6½-in.

COMPLETION

Gun perforating, ft.	4,429-92
Size shots, in.	9/16
Number shots	139
Acidizing at (ft.)	4,465
Amount acid, gal.	2,000

MUD USED

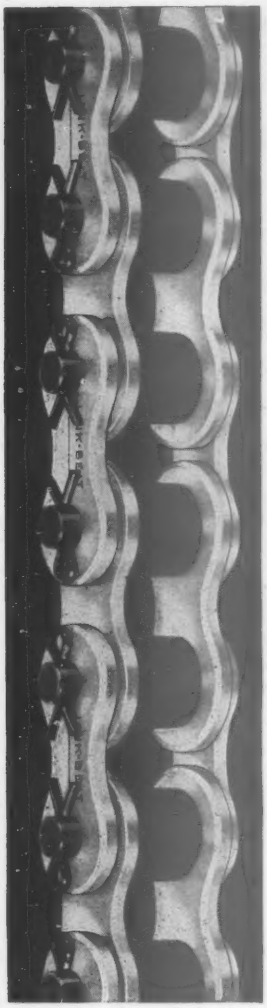
Type	Amount
Aquagel	5 sacks

PRODUCTION TEST

Date	8-7-43
Time flowed, hr.	3
Choke, in.	⅜
Tubing pressure, lb.	200
Casing pressure, lb.	500
Oil, bbl.	99
Water	0
Gas-oil ratio	Very low
Gravity	41°

Silverlink ROLLER CHAIN

PLAYS VITAL ROLE IN "COOKING" STEEL CASTINGS "TO ORDER"



Above: Silverlink roller chain (1¼" pitch RC-100), on cut tooth sprockets, serves to open and close the covers of 11 hardening and draw furnaces in the new TESCO heat treating plant. Power is supplied by a hydraulic drive.
Silverlink roller chain (1½" pitch RC-120), also drives the transfer car to and from loading and unloading points, and the furnace cars to and from furnaces. Power for these cars is supplied through Link-Belt herringbone speed reducers and Friction Fighter roller bearings.

● Texas Electric Steel Castings Company, specialists in oil industry equipment castings, recently began operations in their new million-dollar heat treating plant, which is equipped with 11 vertical type and four car type furnaces fired by natural gas. Temperature, ranging from 1150 to 1800° F., is observed, controlled and recorded from a remote point through use of the most modern, electrically operated control system.

Link-Belt finished steel roller chains and cut tooth sprockets are used throughout this modern plant .... as drives to open and close the covers for the vertical type furnaces; as drives to operate the transfer car and the four furnace cars .... just another of the numerous types of service Link-Belt Silverlink roller chains and sprockets are satisfactorily performing in this vital industry .... just another proof of the value of 68 years' experience in manufacturing and improving dependable chain drives.

LINK-BELT COMPANY

Indianapolis 6, Dallas 1, Houston 2, Los Angeles 33, Kansas City 6, Mo., New York 7, Toronto 8.
Distributors in all fields.

In cooperation with the government conservation program, Silverlink roller chain is now furnished in a durable "blackout" finish.

2265

LINK-BELT
Silverlink
ROLLER CHAINS

REFINING

Thirty-Two Plants in Big 100-Octane Program Finished; Production Soon to Be Doubled

WASHINGTON, D. C. — Thirty-two of the plants embraced in the big 100-octane-aviation-gasoline program planned by the Petroleum Administration for War have been completed, 40 more will be ready within 4 months, and 22 others are scheduled for completion in 1944. Five of the new plants, it is now given out by the PAW, are in foreign countries. One has been finished at Calgary, Alta., by Imperial Oil Co., Ltd., subsidiary of Standard Oil Co. of New Jersey. Two are under construction on the island of Curacao, Netherlands West Indies, by Asiatic Petroleum Corp., subsidiary of Shell Oil Co., Inc. Shell also is building a plant at Montreal. The fifth, nearing completion by Lago Oil & Transport Co., Standard of New Jersey subsidiary, is on the island of Aruba, N.W.I.

The 100-octane program, representing a total investment of $900,000,000, includes 89 plants in the United States. Private companies have done about 75 per cent of the financing, with the rest by Defense Plant Corp. Locations for the five plants on foreign soil were chosen by the PAW, but the financing is by private companies.

Operation of the five foreign plants will be in the hands of the PAW foreign department, which has been reorganized into three divisions: Foreign Supply and Distribution, headed by William D. Crampton; Foreign Production, headed by William B. Heroy; Foreign Refining, headed by S. Stribling Snodgrass. Mr. Heroy has been director of the Division of Reserves. Mr. Crampton and Mr. Snodgrass served several months in the old Foreign Division under James Terry Duce, director, who has returned to his civilian post as vice president of the California Arabian Standard Oil Co.

According to the PAW, production of 100-octane gasoline is now four times what it was early in 1942, and present production soon will be doubled.

The 32 plants already completed: Atlantic Refining Co., Philadelphia; Cities Service Oil Co., East Chicago, Ind.; Continental Oil Co., Lake Charles, La.; Continental, Wichita Falls; Gulf Oil Corp., two plants, Port Arthur; Humble Oil & Refining Co., Baytown; Imperial Oil, Ltd., Calgary, Alta., Canada; Magnolia Petroleum Co., Beaumont; Pan American Refining Corp., Texas City; Phillips Petroleum Co., Borger, and Kansas City, Kans.; Richfield Oil Co., Watson, Calif.; Shell Oil Co., Inc., three plants, Wilmington, Calif.; Shell, Wood River, Ill.; Sinclair Refining Co., Houston; Socony-Vacuum Oil Corp., East Chicago, Ind., and Augusta, Kans.; Standard Oil Co. of California, two plants, El Segundo, Calif.; Standard of California, Richmond, Calif.; Standard Oil Co. of Louisiana, two plants, Baton Rouge, La.; Standard Oil Co. of New Jersey, Baltimore, Md.; Standard Oil Co. (Ohio), Toledo, Ohio; Sun Oil Co., Marcus Hook, Pa.; Texas Co., Lockport, Texas; Texas Co., Port Arthur; Tide Water Associated Oil Co., Avon, Calif.; Union Oil Co. of California, Wilmington, Calif.

The 40 plants nearing completion: J. S. Abercrombie-Harrison Oil Co., Sweeny, Tex.; Ashland Oil & Refining Co., Catlettsburg, Ky.; Asiatic Petroleum Co., Curacao; Associated Refineries, Inc., Duncan, Okla.; Atlantic, Atreco, Tex., and Philadelphia; Champlin Refining Co., Enid, Okla.; Cities Service, Lake Charles, La.; Continental, Ponca City, Okla.; Crown Petroleum Co. and Eastern States Petroleum Co., Houston; Frontier Refining Co., Cheyenne, Wyo.; Central Petroleum Co. of California, Torrance, Calif.; Great Southern Corp., Corpus Christi; Lago Oil & Transport Co., Aruba, N.W.I.; Mohawk Petroleum Corp., Bakersfield, Calif.; National Refining Co., Coffeyville, Kans.; Pan American Refining Co., Texas City; Pennzoil Co, Oil City, Pa.; Phillips, Kansas City, Kans.; Premier Oil Refining Co. of Texas, Cotton Valley, La.; Pure Oil Co., two plants, Smiths Bluff, Tex.; Republic Oil Refining Co., Texas City; Root Petroleum Co., El Dorado, Ark.; Shell, Montreal, Canada, and Wood River, Ill.; Sinclair, Corpus Christi and Sinclair, Wyo.; Socony-Vacuum, East St. Louis, Ill.; Southport Petroleum Co. of Delaware, Texas City; Standard Oil Co. (Indiana), two

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plants, Whiting, Ind.; Standard of Louisiana, Baton Rouge, La.; Standard of New Jersey, Baltimore; Standard Oil Co. (Ohio), Cleveland; Texas Co., Port Arthur; Union Oil Co. of California, Wilmington, Calif.; Utah Refining Co., Salt Lake City, Utah; Wilshire Oil Co., Norwalk, Calif.

The 22 plants to be completed in 1944 are: J. S. Abercrombie-Harrison Oil Co., Sweeny, Tex; Asiatic, Curacao; General Petroleum Corp. of California, Torrance, Calif. Humble, Baytown; National, Coffeyville, Kan.; Pan American, Texas City; Phillips, two plants, Borger; Richfield, Wilmington, Calif.; Shell, Wilmington, Calif., and Wood River, Ill.; Socony-Vacuum, Paulsboro, N. J.; Standard of California, Richmond, Calif.; Standard of Indiana, Whiting, Ind., and Wood River, Ill.; Standard Oil of Louisiana, Baton Rouge, La.; Sun Oil Co., Marcus Hook, Pa.; Texas Co., Wilmington, Calif.; Tide Water, two plants, Avon, Calif., and Bayonne, N. J.; Union, Wilmington, Calif.

Sinclair's Aviation-Gasoline Plant to Be on Stream Soon

CORPUS CHRISTI, Tex.—Sinclair Refining Co.'s 100-octane gasoline plant here will be in operation soon, and, according to E. B. Killick, superintendent, will be a permanent institution, producing gasoline for automotive as well as aviation uses. More than 1,000 men have been employed on the construction work, which has been under way 10 months. The new refinery will have catalytic cracking units.

Atlantic to Complete Two Catalytic Units Next Year

PHILADELPHIA, Pa. — Construction work is well advanced on two catalytic cracking units by Atlantic Refining Co., at Point Breeze, near Philadelphia and at Port Arthur, Tex., it was disclosed here this week after War Department secrecy orders had been partially modified. The two units will be on production early next year, the company announced.

The new facilities employ the fluid catalyst type of high-octane fuel manufacture. The two plants will cost Atlantic more than $14,000,000 and will increase the company's total investment in aviation-gasoline facilities since beginning of the war to around $20,000,000.

In order to overcome the operating bugs in this new process, Atlantic has installed and is now operating a large-scale pilot catalytic unit in its Philadelphia laboratories.

This experimental equipment, built at a cost of $50,000, is a precision unit designed and constructed as a technical miniature of the large catalytic units under construction at Point Breeze and Port Arthur. It is now being operated on a 24-hour schedule every day by a staff of technicians and operators to gain information on the characteristics of processing and products.

The pilot plant is being operated with the same stocks and under identical conditions that will exist in the big crackers when completed.

House Committee Approves Bill for Oil Experiments

WASHINGTON, D. C.—A bill appropriating $30,000,000 for semicommercial experimental plants for production of petroleum from coal, coal shale and other substances was approved unanimously by the House mines and mining committee.

The bill, by Rep. Jennings Randolph of West Virginia, chairman of a subcommittee which has been studying the subject, would establish the plants with federal funds but in co operation with state and educational institutions. One plant probably would be established in a bituminous area, and one in an oil-shale area.

Junking of Operating Plants Deprecated by Legislator

WASHINGTON, D. C. — Plans of Arkansas Fuel Oil Co. to discontinue operation of its Bossier City, La., plant upon completion by the Cities Service Oil Co., of which Arkansas is a subsidiary, of a large refinery at Lake Charles, La., were criticized here last week by Representative Brooks, of Louisiana, in an address before the House.

"On the one hand," he asserted, "is a refinery financed by the taxpayers just being completed, and on the other is one privately operated which is about to be torn down."

Shortage of crude supplies is said to make operation of both plants impossible, so available crude is to be used in operating the new plant, which is designed to make the aviation gasoline necessary for war purposes.

Manpower Priority for Plant Expansion Given Union Oil

LOS ANGELES, Calif.—The War Emergency Committee has given first priority on manpower to Union Oil Co.'s $40,000,000 refinery expansion project in order to increase aviation capacity on the Pacific Coast. Work has been under way about 18 months. It is expected that except for the catalytic cracking tower the plant will be in operation early next year.

While high-octane gasoline will be the most important product, special Navy fuel and diesel oils, as well as feed stock for other critical wartime products, will be manufactured.

For once, Radio Tokyo was almost right

The first time it happened was in the Solomons. Thirty-six Jap bombers left their base to attack one American battleship. *None* came back. Radio Tokyo whimpered that the warship evidently carried "six-inch machine guns" . . . and for once they were almost right.

For the Navy's new twin mount, five-inch gun, whipping gracefully 'round its cradle, lashes out every five seconds . . . lashes out and pulverizes, leaving no survivors and no cripples. It's more than anti-aircraft. It's aircraft *hunting*.

Consolidated Steel Corporation manufactures this weapon under contract to the Navy Department. Working to precision tolerances of 2/10,000 of an inch, volume production is today *seventeen months ahead of schedule*—a record that has won for the men and women of Consolidated every basic government industrial award.

And when tomorrow comes, when the last enemy plane is smashed, the ingenuity and skill of Consolidated Steel craftsmen will return to the fabrication of peacetime steel, seeking out, welcoming, and *handling* the "tough" jobs of postwar construction.

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Navy 5-inch twin mount anti-aircraft gun produced in volume by Consolidated Steel Corporation, Ltd.

PIPE LINES

WEP Shipments Meet PAW October Schedule

A total of 9,341,514 bbl. of crude oil were shipped northward from Longview, Tex., in October through the War Emergency Pipelines, Inc., 24-in. line. Average daily shipments were 301,334 bbl. for the month. Shipments on October 31 were 317,000 bbl. Deliveries amounted to 9,067,655 bbl. in October; the difference between shipment and delivery figures is represented by oil going into storage at Norris City, Ill., and at points eastward as well as for filling the lateral and distribution lines serving the New Jersey refining area. October shipments were routed as follows: 9,900 tank cars carried 2,144,428 bbl. from Norris City; loading racks on the Ohio Oil Co. system handled 1,126,798 bbl.; to Philadelphia, 4,371,859 bbl.; to Linden, N. J., 1,424,570 bbl. All pump stations on the eastern extension of the 24-in. line have been completed with the exception of Station 24 near Marietta, Pa.

The November schedule calls for shipping 9,090,000 bbl., consisting of 4,440,000 bbl. from East Texas, 1,500,000 bbl. from Southwest Texas and 3,150,000 bbl. from West Texas. Tank-car shipments of crude from Norris City have been discontinued except for movement consigned to East Braintree, Mass.

Early this week the WEP 20-in. products line had been filled with water as far as El Dorado, Ark.; water is being pumped into the line at the rate of 5,000 bbl. per hour. Pressure at Beaumont, Tex., November 1, was 800 lb. Testing will be under way next week for three sections of more than 200 miles each. Operations for testing will start at the north end, following this a central section will be tested before the final tests at the Gulf Coast end. Test pressure of 800 lb. will be maintained for 6 hours at each section.

Less than 100 miles of 20-in. pipe remains to be laid for the WEP products line for which more than 1,355 miles had been laid at the first of the week. B & M Construction Corp. starts this week to lay 60 miles of 8-in. pipe from Beaumont, Tex., to Lake Charles, La., to bring products to the WEP system. All pipe work for the WEP products line will be finished this month and it is expected that shipments of heating oil will be going eastward in January. A proposal is being considered by PAW for batching a certain amount of heating oil through the 24-in. crude-oil line. Such a procedure would probably call for moving 25,000 bbl. daily through the Ohio Oil Co. and Tuscarora Oil Co., Ltd., systems to the East Coast.

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Humble Contemplates Mascho Pool Outlet

FORT WORTH, Tex.—Humble Pipe Line Co. has filed application with PAW to lay a pipe line into the Mascho pool of southern Andrews County, Texas, according to reports here. This is the only pool of any size in West Texas now without a pipe-line outlet. Oil from the area is being trucked to the Humble station in the Fuhrman pool.

Humble plans to lay 12 miles of 6-in. line from the Mascho area to the Emma pool, also in Andrews County. Approximately 12 miles of 4-in. gathering system also will be laid within the area along with several pump stations.

The Mascho area has a daily allowable of 1,840 bbl. During the current month it has been on pipe-line proration, with Humble taking only 83 per cent of the allowable.

Ohio Fuel Gas Lays Line for Two Pools

The Ohio Fuel Gas Co. is laying 24 miles of 8-in. coupled line to connect the Wellington and Pittsfield pools in Lorain and Medina counties, Ohio, to existing lines running into their Ashland and York compressor stations. The line will have a capacity of 24,000,000 cu. ft. on installation of additional equipment at the York station. Contractor for this line is Harry Strodtbeck.

Revamped Refugio Line Delivers to Houston

Southwest Emergency Pipe Line Co. made initial delivery of crude oil from Refugio to Houston, Tex., October 26. The line, currently delivering oil at the rate of 50,000 bbl. daily, will have a capacity of 75,000 bbl. daily when all stations are operating. All five stations on the line are completed and will be placed in operation shortly. Southwest Emergency Pipe Line is a project of Defense Plant Corp. which has been leased to Defense Supplies Corp. Humble Pipe Line Co. is acting as agent for these government corporations without fee or profit in constructing and operating the line.

The 150-mile pipe line was converted to the transportation of oil by reconditioning a 14 and 16-in. gas line between Refugio and Pierce Junction, Tex., purchased by Defense Plant Corp. from Houston-Gulf Gas Co. The gas line was completely reconditioned by being taken out of the ground, cleaned and repaired, and then welded and tested to pressures of 550 lb.

In addition, a new 24-mile section of 12-in. line was constructed from Pierce Junction to the Houston terminal of Southwest Emergency, a portion of the Galena tank farm, which was rented from Texas Co. In order to deliver oil from the Corpus Christi, Tex., area to the initial station of the line located at Refugio, the Atlantic, Barnsdall, Humble, and Texas Co. lines have arranged to reverse their movements at Corpus Christi, area.

The Southwest Emergency Pipe Line is a project of the Petroleum Administration for War and was endorsed by the transportation committee of District 3 in order to provide outlet from the Corpus Christi area when the diversion of tankers re-

stricted production sharply. The proposed schedules call for the line to handle West Texas and Southwest Texas crudes to Houston, Tex. From this point, the oil will move to the WEP 24-in. crude-oil line at Longview, Tex., either through the reversed Pan American and Shell lines or in part through the Sinclair line to Beaumont, Tex., and the reversed Sun line, Beaumont to East Texas.

Valuation Set for Eastern Socony-Vacuum Pipe Lines

WASHINGTON, D. C.—The Interstate Commerce Commission has fixed final valuation for rate-making purposes of the properties owned and used for common-carrier purposes, by Socony-Vacuum Oil Co., Inc., Midland division and New York and Pennsylvania lines, at $5,125,000 as of December 31, 1943.

This valuation affects approximately 396 miles of trunk pipe lines in Pennsylvania, New York, Illinois, Indiana, Ohio and about 37 miles of gathering lines in Pennsylvania and New York, which Socony-Vacuum owns and operates.

Gasoline Line Shipments Increase 82 Per Cent

Pipe-line transportation of gasoline in August was nearly double that of a year earlier, and was above a month earlier. Movement of gasoline in pipe line in the first 8 months of 1943 registered a noticeable increase from the corresponding 1942 period.

Calculations from Bureau of Mines figures indicate that the volume of gasoline transportation by pipe line was approximately 36 per cent of the total production of motor fuel in August, whereas a year earlier the pipe-line gasoline movement was only about 21 per cent in volume of the slightly smaller total of motor-fuel production.

Motor fuel turned into pipe lines in the first 8 months of 1943 totaled 127,678,000 bbl., against 79,345,000 bbl. in the corresponding 1942 period, an increase of 60.91 per cent.

Total motor fuel turned into lines in August was 19,278,000 bbl., compared with 18,656,000 bbl. in July, and 10,615,000 bbl. in August 1942, an increase of 81.61 per cent. The increase from July was 3.33 per cent.

Motor fuel delivered from lines in the first 8 months of 1943 totaled 125,770,000 bbl., against 79,670,000 bbl. in the corresponding 1942 period, an increase of 57.86 per cent. In August the total delivered from lines was 19,172,000 bbl., against 18,752,000 bbl. in July, and 10,912,000 bbl. in August 1942, an increase of 75.70 per cent from a year earlier.

Stocks in lines and working tanks at the end of August totaled 7,809,000 bbl., compared with 7,816,000 bbl. a month earlier, and 5,657,000 bbl. a year earlier.

Tennessee Orders 900 Miles Of A. O. Smith Pipe

A. O. Smith Corp. will furnish 900 miles of 24-in. pipe for the Tennessee Gas & Transmission Co. line. The order is for approximately $10,000,000 and calls for 150,699 tons of 24-in. welded pipe of ¼-in. wall thickness.

National Tube to Start On Tennessee Pipe

River pipe for the Tennessee Gas & Transmission Co. Texas-Kentucky 24-in. natural-gas line will be coming out of mills of National Tube Co. this month. During the first quarter of 1944 these mills will be making 300 miles of 9/32-in. wall-thickness pipe for the project.

Zenith Gas Increases Transmission System

Work is being completed for laying 4 miles of 8-in. pipe for Zenith Gas System, Inc., according to an announcement by W. L. Woodward, president. The line starts at the Alva, Okla., takeoff on the company's transmission line and extends north. This new line will replace a 6-in. line which is being taken up and relaid parallel to another 6-in. line of the system.

Lone Star Completes Line to Increase Capacity

Additional natural gas for Dallas and other cities in the 4,500-mile pipe line network of the Lone Star Gas Co. became available last week when a 35-mile extension loop was completed from the Cayuga gas field in Anderson County, Texas, to a gate 9.5 miles east of Alma, Ellis County, Texas, Julian L. Foster, general superintendent and chief engineer of the company, announced.

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. . . the convenient, economical way. Install UNIBOLT "BIG INCH" COUPLINGS with Blanking Plugs on your pump suctions.

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The H & M Pipe Cutting and Beveling Machine cuts any size pipe with speed, economy and accuracy.

SPEED: Complete cut and bevel can be made on 12 inch pipe in about 2 minutes.

ECONOMY: Save approximately one-half labor and gas costs.

PORTABILITY: Can easily be carried from one pipe section to another.

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Pipe Beveling Machine Co.
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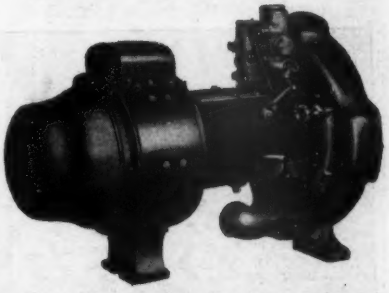

Over 40 years of engineering experience is back of every Moon Turbo Generator. The latest improvements and features have been developed through a study of the needs of many users.

Moon Turbo Generators are rugged, durable, and built to handle difficult lighting jobs with ease. They are compact and simple in construction. The governor compartment is accessible while the swinging covers open to allow inspection of the entire dynamo.

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MOON MANUFACTURING CO.
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IN JUST THREE HOURS... two men have hooked up 1,000 feet of ready strung 4-inch line in 20-foot joints. *Victaulic is the fastest known method of coupling pipe.* Its flexibility eliminates the need for accurate aligning of pipe... saving money, saving time, saving man-hours. Self-Aligning Victaulic Couplings give you all these added advantages...

1 **Fast, Self-Aligning permits angular deflection!**

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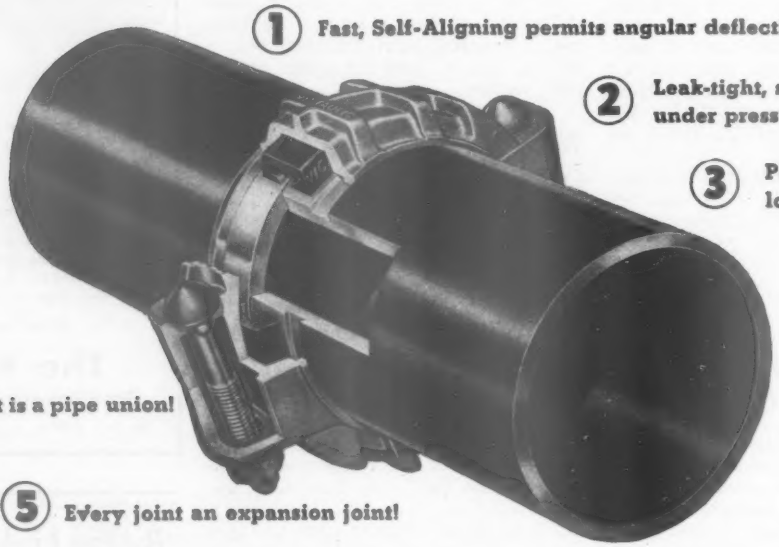
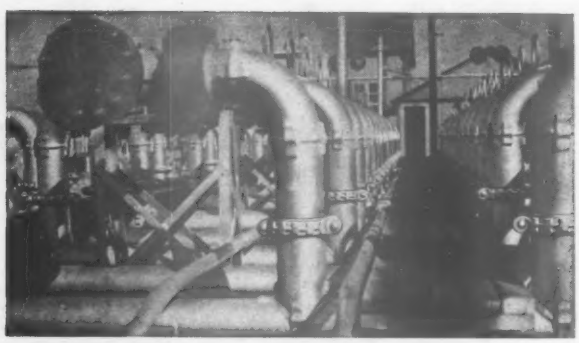
3 **Positive mechanical lock of pipe lengths!**

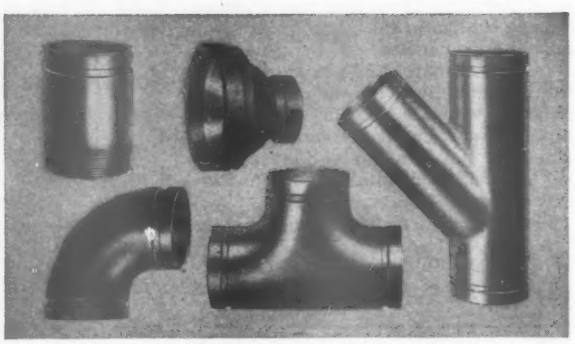


4 **Every joint is a pipe union!**

5 **Every joint an expansion joint!**



YOU DON'T NEED EXPENSIVE EQUIPMENT! An unskilled workman with a small socket wrench can do the job with ease. On permanent jobs, maintenance is nil. Temporary lines can be salvaged. Pipe can be re-used without re-conditioning pipe ends! Known and used by practically the entire oil industry!



VICTAULIC FULL-FLOW FITTINGS! A new line of redesigned pipe fittings to eliminate undue frictional losses! Engineered with long easy sweeps to reduce the possibility of clogging to an absolute minimum. A real contribution to greater efficiency in conducting fluids and gases in pipe systems.

OIL

VICTAULIC

SELF-ALIGNING PIPE COUPLINGS AND FULL-FLOW FITTINGS

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Natural Gas

Cayuga and Long Lake Get Increases in Gas Ratios

AUSTIN, Tex.—Permission to produce more gas was granted last week to operators in the Cayuga and Long Lake fields. The state Railroad Commission last July 16, following a series of hearings and studies of alleged waste in the two fields, ruled that not more than 2,000 cu. ft. of gas should be produced with each barrel of oil. The new order allows Cayuga operators to produce 5,000 cu. ft. with each barrel, and Long Lake operators 10,000, provided that all excepting 2,000 cu. ft. is sold for useful purposes.

Action Deferred on Request For Higher Price for Gas

WASHINGTON, D. C.—Action on a request for an increase in the price of gas produced in that part of the Hugoton field lying in Texas County, Oklahoma, was deferred last week by the Office of Price Administration. Representative Rizley of Oklahoma asked for a minimum of 4 cents a 1,000 cu. ft., saying that gas taken from the Oklahoma part of the field sells for 2 cents, compared with 4 to 5 cents on the Kansas side. He said OPA officials would not make a decision until they received some information from the Oklahoma Corporation Commission.

Basic Natural-Gas Order Altered By WPB's U-7

WASHINGTON, D. C.—A new utilities limitation order affecting natural gas was issued October 25 by the War Production Board, to supersede Limitation Order L-31. The new order, U-7, was explained in a letter from the Office of War Utilities to natural-gas utilities and non-utility suppliers.

Listed below are some of the more important changes embodied in Utilities Order U-7.

Paragraph (b) (Integration): Non-utility suppliers have been more thoroughly covered into the integration provisions, and it has been provided in paragraph (b) (6) that a non-utility supplier which was delivering natural gas to a utility in a shortage area on October 1, 1943, may not reduce deliveries to such utility without the approval of the War Production Board unless it is no longer capable of maintaining such deliveries, or in the process of carrying out curtailments pursuant to paragraph (c) (1). The revised definition of "natural gas" makes it apparent that a refiner or other processor of petroleum products is covered by the provisions of U-7 in respect of the use or disposition of any combustible fuel gas remaining at the completion of the processing operations.

In paragraph (b) (4) it is now expressly provided that the War Production Board may require curtailments on the systems of any utility or non-utility supplier in order to maximize the supply of gas which can be made available to utility systems where an acute shortage exists.

Paragraph (c) (Operations during gas shortages): Two new steps in the sequence of interruption of deliveries during gas shortages have been added in paragraph (c) (1). Subparagraph (c) (1) (i) now provides that in interrupting deliveries to interruptible consumers within the limits of contractual rights, deliveries shall nevertheless continue to be maintained to any consumers to the minimum extent necessary to prevent permanent damage to production and service facilities. Such deliveries must, however, be interrupted under subparagraph c) (1) (v) at times when that paragraph becomes operative. An example of consumers who would be protected by this provision is the glass industry, which would be obliged to drain its tanks at the very outset of curtailment operations unless it received enough gas to keep the contents of its tanks liquid. Accordingly, the supplier is directed to supply such consumers with the minimum amount of gas necessary to prevent freezing and draining of tanks until in the sequence of curtailment (c) (1) (v) is reached. A second new step is provided by subsections (c) (1) (vii) which requires curtailment of deliveries to Exhibit A consumers who can be curtailed without loss of production in advance of curtailing other Exhibit A customers. Information as to the identity of the consumers to be curtailed under this subparagraph can be obtained by any supplier through the War Production Board whenever it appears the need for the information is imminent.

Paragraphs (c) (5) and (c) (8) of U-7 make provision for three forms to be used in connection with gas shortages. Form WPB-619 is a consumer classification list which replaces PD-282, and is to be filed with the War Production Board by all suppliers upon request. All major systems will be expected to file this form, and in addition small systems in critical areas will also be required to file. Although the order states that this form shall be filed on or before November 15 of each year, this date is extended to November 25, 1943, for the current year due to the shortness of time. Forms are being sent out almost at the same time as this letter.

Form WPB-2077 summarizing storage operations each month is also required to be filed only by companies specifically requested to file. On the other hand, Form WPB-620 summarizing curtailment operations must be filed monthly by every system which has curtailed deliveries to any consumer on its system during the previous month.

Paragraph (h) (3) makes provision for Form WPB-3314. This is the form on which all applications are to be made for exemptions from any of the restrictions on gas deliveries contained in paragraphs (d) and (e).

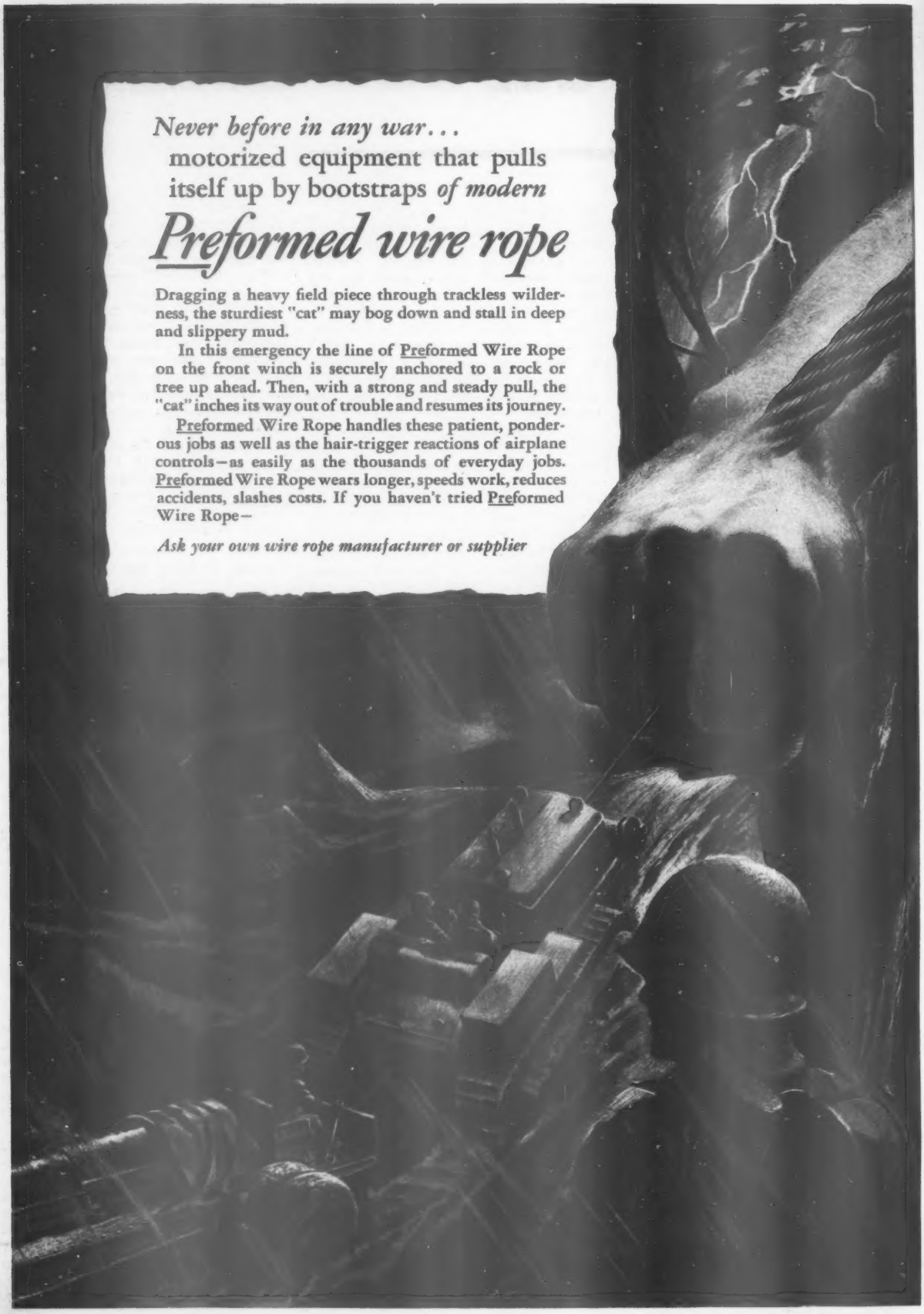
Texas Public Service Buys Galveston Gas Properties

DALLAS, Tex.—A contract for sale of Galveston Gas Co.'s properties to Texas Public Service Co. has been closed, according to D. A. Hulcy, president of Lone Star Gas Co. The transaction is a step in the reorganization of Lone Star ordered by the Securities and Exchange Commission, under which that company is to dispose of properties in Galveston and El Paso. It involves the system by which natural gas purchased on the mainland from Houston Pipe Line Co. is distributed in Galveston and outlying communities. Lone Star's contract with Houston Pipe Line would be assumed by Texas Public Service Co. under the plan.

Texas Gas to Be Used in Production of Plastics

AUSTIN, Tex.—Plans for construction of a new chemical plant in Texas to manufacture plastics through the use of natural gas as the basic raw material were disclosed here last week at a meeting of the American Society of Civil Engineers, Texas section.

George C. Smith, of St. Louis, Mo., assistant to the president of the Missouri - Kansas - Texas Railway, described the forthcoming plant as a huge one. He praised the possibilities of Texas as an industrial empire, and said Waco will have within a few weeks a new glass container plant in addition to the General Tire & Rubber tire factory recently located there.



Never before in any war...
motorized equipment that pulls itself up by bootstraps *of modern*

Preformed wire rope

Dragging a heavy field piece through trackless wilderness, the sturdiest "cat" may bog down and stall in deep and slippery mud.

In this emergency the line of Preformed Wire Rope on the front winch is securely anchored to a rock or tree up ahead. Then, with a strong and steady pull, the "cat" inches its way out of trouble and resumes its journey.

Preformed Wire Rope handles these patient, ponderous jobs as well as the hair-trigger reactions of airplane controls—as easily as the thousands of everyday jobs. Preformed Wire Rope wears longer, speeds work, reduces accidents, slashes costs. If you haven't tried Preformed Wire Rope—

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Exploration and Drilling

Week's Highlights

THE importance of price in secondary-recovery operations is again revealed in a cooperative study of the Bureau of Mines and State of Oklahoma which will be made available to the industry later this month in a 182-page report. The complete investigation which covers water-flooding operations in Oklahoma up to July 1, 1942, clearly reveals a leveling off in operations which investigation reveals was due to (1) the scarcity and increased cost of labor and supplies, and (2) the low price of crude oil.

It is explained that before the advances in costs because of war conditions the average cost of developing a water-flooding project with like wells spaced at 330-ft. intervals and producing from a depth of 500 ft. was in excess of $1,000 per acre. With the higher costs many producers who are experienced in water-flooding operations do not feel that they are justified in taking the additional risk.

According to the report there are 40 operators engaged in water flooding in Oklahoma consisting mostly of individuals or small companies. Collectively they now hold most of the acreage in that state which could be flooded provided prices are high enough to justify the risks and costs involved.

Sixty-one of the 73 water-flooding projects which have been started in the state are now operating. These operations started in a small way in the state in 1931 and by 1940 a peak production of 3,665,580 bbl. was reached. Since then, owing to the operating conditions outlined above, the production has dropped to about 3 million barrels annually.

Attention this week swung back to the Rocky Mountain area where a wildcat test on the Clark's Lake prospect, Larimer County, northern Colorado, had recovered 20 ft. of saturated Muddy sand (p. 76). Two drill-stem tests had been made at total depth of 5,907 ft. but resulted only in recovery of drilling mud. Sand was topped at 5,888 ft., two 5-ft. cores were cut and one 10-ft. core was recovered. The Muddy sand, productive in the Wellington and Fort Collins fields, is the first sand in the Dakota. Operators probably will test the second Dakota sand which lies approximately 30 to 40 ft. below the Muddy.

Third sand in the Dakota, called Lakota locally, normally rests about 70 ft. below the middle sand member. The Sundance sand, nonproductive both at Wellington and Fort Collins, lies about 200 ft. below the third Dakota sand.

The Clark's Lake prospect is approximately 3 miles southeast of the Wellington field on the western rim of the Denver basin. The Muddy sand at Wellington produces from around 4,200 to 4,300 ft. While the field's production has been somewhat below expectations, it has proven sufficiently attractive to invite further examination of the general area.

Full recovery from the 30-ft. sand section cored up to early this week showed promising saturation but failure of the drill-stem tests to show either oil or pressure caused operators to conclude that the well has scarcely any commercial significance at its present stage of development.

Interest subsided somewhat during the week in the new low-gravity oil well discovered in Florida. The lull was of a temporary nature, however, while the operators prepared to install pumping equipment, after 4 days of swabbing resulted in recovery of 1,610 bbl. of fluid, including 736 bbl. of oil and the rest salt water. Faith in the district was nevertheless evident by announcement that the discovering company has made location for a second well near Sunniland.

COMPLETIONS IN ALL FIELDS . . .

(Week ending October 30, 1943)

	Oil	Gas	Dry	Total	Footage	Total Comp. to date 1943	1942
N. Y., Penna. and W. Va.	43	24	2	69	120,928	2,839	2,877
Ohio	3	13	5	21	59,139	765	941
Indiana	4	0	1	5	11,522	186	281
Kentucky	9	13	8	30	58,028	376	158
Illinois	26	0	16	42	111,615	1,473	1,485
Michigan	3	1	8	12	32,100	501	578
Kansas	21	0	15	36	121,061	1,373	1,291
Nebraska	0	0	0	0	0	26	30
Missouri-Iowa	0	0	2	2	2,271	17	13
Oklahoma	8	0	6	14	54,189	968	983
Texas:							
North Central Texas	19	0	17	36	92,019	1,226	908
West Texas	18	0	3	21	75,528	737	1,146
Texas Panhandle	4	0	0	4	11,961	150	295
Eastern Texas	3	0	0	3	27,726	239	337
Texas Gulf Coast	4	0	9	13	89,662	383	588
Southwest Texas	6	4	8	18	105,154	760	877
Total Texas	54	4	37	95	402,050	3,495	4,151
North Louisiana	0	2	1	3	9,869	261	397
Louisiana Gulf Coast	7	0	2	9	65,221	298	397
Total Louisiana	7	2	3	12	75,090	559	794
Arkansas	2	0	0	2	15,150	214	145
Mississippi and Southeast	2	0	1	3	28,929	78	52
Montana	7	0	0	7	16,817	193	173
Wyoming	3	0	1	4	12,076	117	92
Colorado, Utah	0	0	0	0	0	21	20
New Mexico	3	0	0	3	11,028	192	200
California	30	2	4	36	121,035	1,119	617
Total United States	225	59	109	393	1,253,028	14,512	14,881
Total previous week	220	33	126	379			
Week ending Nov. 1, 1942	183	40	97	320			

Oil From Coal Requires New Mining Methods

by Frank C. Greene

In The Oil and Gas Journal (Sept. 30, 1943, p. 80) the possibilities of oil from coal were discussed by quoting excerpts from a letter written by Frank C. Greene, a mining engineer with many years of experience in coal mining. Mr. Greene has written again outlining processes in some detail. This article consists of excerpts from his letter.

INITIALLY, certainly, the oil industry will make every effort to recover much of the odd 75 per cent of oil believed to remain in the reservoirs. Mining for oil has been proposed for decades. I have been afforded opportunity to study some of the mining methods proposed. I should say that the petroleum engineers making the proposals and detailed layout plans had followed too closely ancient and fairly recent methods of mining for coal — lump coal.

Mining for lump coal entails all the incongruities accumulated during four centuries. Normally the coal miner could not sell the finer sizes of coal. Even the automatic stoker requires a special-size coal free from slack and dust. To propose use of total fine-size coal would be fatal to the coal trade.

On the other hand, to propose lump coal for hydrogenation purposes would be equally fatal. Thus, eventually, two entirely separate industries of coal must arise or, and probably, the extant industry will be taken over by the new industry of coal. It will be a 2-billion ton annual business.

In my opinion, oil-shale mining can be dismissed in a few words. The rock is as easily mined as would be shoe-leather. Ealaeophyton coorongiana, the dominant algae, have rendered the fine silts difficult to extract by any method in any good yield stratum. And to reduce them to proper retorting sizes would be costly. Even so reduced and retorted by whatever known method, the inert residue, probably averaging more than two-thirds of the best paper shales, presents a difficult problem of waste disposal.

Though remote from product market, the Athabaska tar sands will initially be easier, less costly to handle than any oil shale. And they can be mined by methods suited to the mechanisms with which the oil wildcatter is familiar. But why go to such remote regions? California and other states contain them.

The European processes as affecting United States coal and oil industries are far too inflexible for the American tempo. By the methods proposed by the writer, the range of product may be from 100 per cent coaleum to 100 per cent solid fuel (a preformed or otherwise char far superior to coal as fuel). We must recall that even a fair coal has some 90 per cent convertible substance in it. Thus, we have no waste-disposal problem as with shales or sands.

The vital mechanism underground is the simple thin-bed mining machine with two operators. Each machine would mine, either advancing or retreating (i.e., either room or rib) and at once plenum the, say, rice-size coal grains to the surface plant via pipe line. If the face is far from the mine portal then a nearby drill hole to the surface would convey possibly all the mine could produce. If there is ample methane at the face, this, too, would be educted and used in coal processing.

No Explosives Needed

No explosives would be used. No coal dust would be left in the mine. Even in thin beds the roof would have to be very bad to require any notable amount of timbering in advancing work and but very little more when the same machine pulls the ribs in retreat.

The surface plant would consist of a simple raw coal receiving bin holding, say, a day's run-of-mine. The beneficiating equipment would depend on the nature and amount of bands, if any, in the bed. If the grains are cleared of free sulfur and bone and rock by wet process, the special dryer elevator delivering hot, dry, clean coal grains to the converter functions as a preheater — a notable salvage of heat time.

Initially the liquid product would be a thin low-temperature tar oil easily fractionated and in manner that the pitch-vapor stays with the char residue and permits it to be shoved from the converter as a suitable preformed fuel (not briquets), smokeless and clean and convenient to handle. What small amount of converter gas is made will usually do the preheating of fuel.

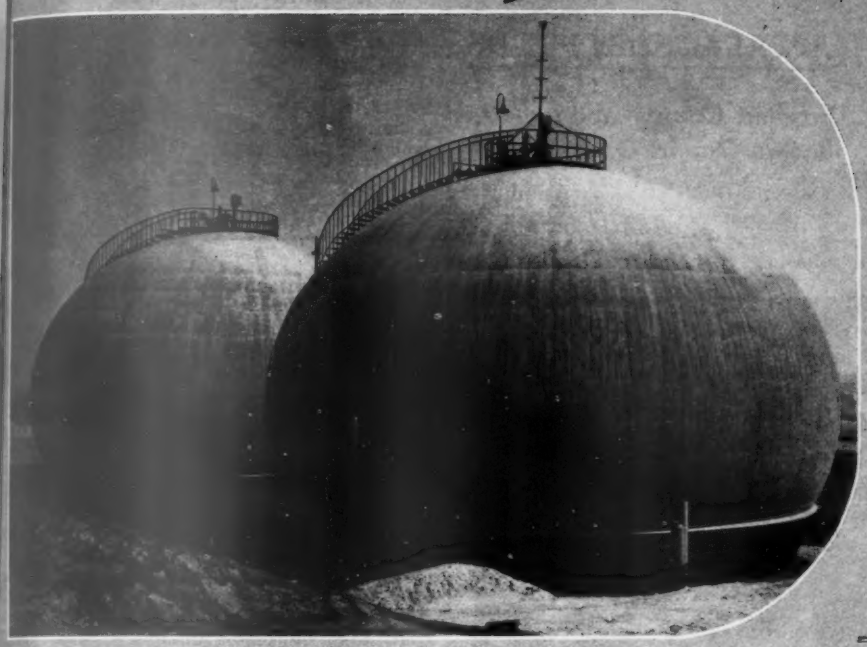
The converter may put through 100 or more tons a day, a one-man operation. The initial condensing equipment will likewise be run by one man per shift. Later on, the change from low-temperature work to hydro-

DAILY AVERAGE PRODUCTION FOR WEEK

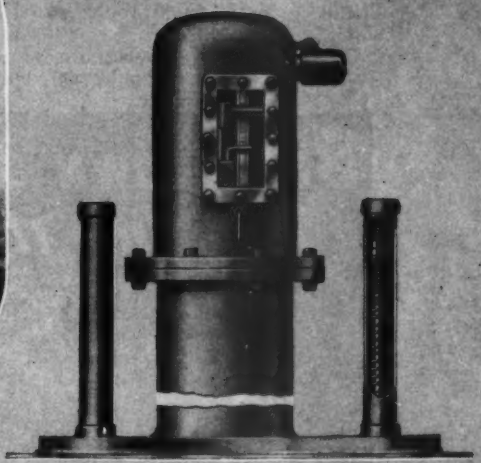
	Oct. 30 crude oil	Distillate, allied products	Oct. PAW-quota all oils	Oct. 23 crude oil
Arkansas	78,900	4,000	81,700	78,400
California	780,250	46,000	832,000	785,750
Colorado	7,200	.....	7,000	7,300
Eastern fields	73,200	6,000	87,200	74,800
Illinois	223,800	11,500	219,500	224,700
Indiana	13,350	.....	13,800	13,850
Kansas	274,600	4,900	300,000	284,750
Kentucky	24,100	2,000	26,600	24,320
Louisiana	358,700	27,000	375,700	359,800
North Louisiana	79,600	.....	.....	80,800
Louisiana Gulf Coast	279,100	.....	.....	279,000
Michigan	56,000	100	59,100	54,400
Mississippi	46,400	.....	50,000	47,000
Montana	22,700	300	23,400	21,380
Nebraska	1,700	.....	1,800	1,700
New Mexico	109,000	5,400	116,600	112,200
Oklahoma	329,400	27,000	345,700	326,500
Texas	1,891,900	116,000	1,999,000	1,891,900
East Texas	368,700	.....	.....	368,700
West Texas	354,050	.....	.....	354,050
North Central Texas	138,300	.....	.....	138,300
East Central Texas	135,250	.....	.....	135,250
Texas Panhandle	88,100	.....	.....	88,100
Texas Gulf Coast	708,350	.....	.....	708,350
Southwest Texas	99,150	.....	.....	99,150
Wyoming	105,100	2,000	99,600	106,300
Total United States	4,396,300	252,400	4,638,700	4,415,050

Total production January 1-October 30, 1943 ..... 1,229,804,785 bbl.
Same period last year ..... 1,178,803,670 bbl.

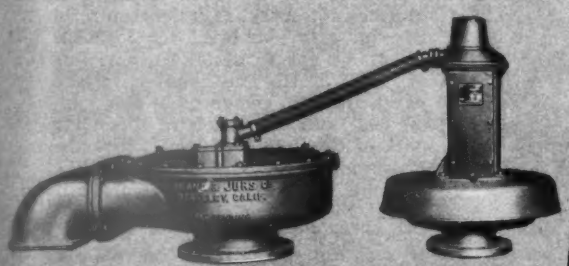
For Measuring and Conserving VOLATILE LIQUIDS



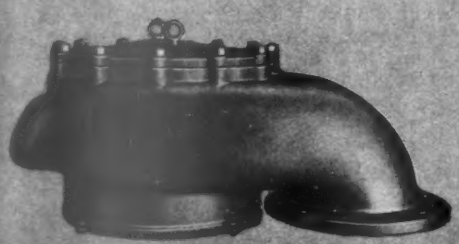
Two Hortonspheroids built for a Pacific Coast refiner. They are of 15,000 barrel capacity and operate at 10 pounds per square inch.



The S. & J. Automatic Tank Gauge which compensates for the slight movement of the tank roof.



The CBL Safety Regulator vents the tank vapors to the atmosphere when the tank pressure exceeds the venting pressure.



The S. & J. Vacuum Breather Valve is designed to relieve the vacuum prevailing under normal operating conditions.

Synthetic rubber and high octane gasoline projects call for many specialized fittings for the accurate measurement, safe handling and transfer of vital volatile liquids stored under pressure. Fortunately, we have long been specialists in the gauging, transfer and conservation of highly volatile liquids and have been able to meet new demands quickly and intelligently.

Pictured on this page are two Pacific Coast Hortonspheroids which operate under a pressure of 10 pounds per square inch, and three S. & J. Fittings with which each is equipped. We are prepared to furnish many other fittings suitable for tanks of all shapes and sizes, operating from atmospheric pressure up to 150 pounds. When it's tank fittings you need, please inform us of your requirements.

SHAND & JURS CO.

BERKELEY, CALIFORNIA

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SHAND & JURS

genation (indirect, low pressure) would be effected at once by means I am not free to discuss at present. If mine-face gas is in notable amount, the blue-gas equipment needed in the Fischer-Tropsch process would be unnecessary.

Properly designed and managed, it is possible that a bed such as the Henryetta coal of Oklahoma would be extracted over 90 per cent. If half product is crude coaleum and half solid fuel from, say, 2,000 tons daily, the over-all costs should not exceed $2 per ton and the net realizations should be around $4, all roughly estimated.

The capital costs for such mine and surface betterments should not be more than for modern collieries of like capacity, say $500 per ton day. Underground and surface personnel probably would not exceed one-third that of like-capacity orthodox collieries.

APPALACHIAN FIELDS

Fayette County Wildcat Shows Gas in Onondaga

PITTSBURGH, Pa. — In Southwest Pennsylvania, a new Oriskany test is starting in Beaver County. On Chestnut Ridge, a deep test in Fayette County, is gaging over 1,000,000 cu. ft. in the Onondaga chert. In Allegheny County there was a fair shallow gas well. In West Virginia, an Oriskany test is starting in Williams district, Wood County. In Union district, Kanawha County, there was some added large Big lime gas production. During the week in the lower eastern fields, 38 completions were reported of which 3 were dry, 26 gas wells, and 9 oil producers with a daily initial of 156 bbl., most of which was in Southeast Ohio.

N. CENTRAL TEXAS

Marble Falls Field Opened Near Murray, Young County

WICHITA FALLS, Tex. — Fleming Oil Co. and Fleming-Kimball Corp. 1 M. K. Graham, Section 2912, T.E. &L. Survey, 4½ miles northeast of Murray in southern Young County, opened a new Marble Falls lime pool last week when it was completed flowing 75 bbl. per day from pay at 4,253-68 ft., after shot of 75 qt. The well had been a failure in the Caddo lime, and was deepened to the Marble Falls after the 2 Graham, one location east, Mississippi lime discovery, was plugged back to the Marble Falls for completion for 110 bbl. per day from 4,298 to 4,325 ft.

In Jack County, Bryson pool, Brazos River Gas Co. 2 D. C. Clayton, Matthews Survey, 2 miles south of Bryson, was completed for 3,000,000 cu. ft. of gas from Mississippi lime at 4,767-70 ft. The regular Bryson pay is the Strawn sand, but one small oil well was completed in the north part of the field last year from the Mississippi lime.

Eight miles northwest of Jacksboro, Shell Oil Co., Inc., 1 W. T. Pursley, Slaughter Survey, total depth 5,977 ft., was running casing to make a test of the Mississippi lime zone from 5,438 to 5,822 ft. which showed some oil on drill-stem tests. The test topped the Ellenburger at 5,822 ft.

Clay County.—Shell 1 R. F. Wynne, west of Bellevue, had a small show of oil in Caddo lime topped at 5,845 ft., and took a drill-stem test in conglomerate from 5,974-86 ft., recovering 30 ft. of gas-cut mud with a trace of oil, and was drilling below 6,050 ft.

Archer County.—The Little Wichita pool was given a ½-mile-east extension when Deep Oil Development Co. 26 Wilson, Lot 1, Block 118, A.T.N. C.L. Survey, hit Caddo lime at 4,874 ft. showing oil to 4,893 ft., total depth, ran electric log, and cemented 5½-in. casing to 4,983 ft., which will be perforated opposite the show.

Cooke County.—Possible Ellenburger discovery in northwestern Cooke County is Perkins and Bourland 1 Dangelmeyer, Eleanor Langford Sur-

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AMERICAN ROLLER BEARINGS HEAVY DUTY

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Heavy-Duty ROLLER BEARINGS

vey, 7 miles northwest of Muenster, which had show of oil in Ellenburger topped at 2,176 ft., and recovered 165 ft. of heavily saturated mud on drill-stem test. After running electrical survey casing was cemented at 2,176 ft.

NORTH TEXAS WILDCAT COMPLETIONS

Archer County: J. L. McMahon 1 A. J. DeMoss, 200 ft. from N, 800 ft. from W, Lot 17, Blk. 5, Clark & Plumb subd., dry, T.D. 1,115 ft.

G. E. Kadane & Sons 1 Jones & Cullum, 330 ft. from N and E, Sec. 2, S. P. Ry. Co. Sur., dry, T.D. 5,055 ft.

Rathke Oil 1 S. J. Moss, 300 ft. from N, 2,000 ft. from E, Sec. 2479, T.E.&L. Sur., dry, T.D. 1,654 ft.

King County: Humble Oil & Ref. 1 Bateman Trust estate, 660 ft. from E, 4,204 ft. from S, Sec. 101, Blk. A, J. B. Rector Sur., flow 361 bbl. 3/8-in. choke, 33.1° gravity, pay 3,702 ft., Cisco lime, T.P. 365-320 lb., C.P. 450-320 lb., T.D. 3,713 ft. Discovery.

Young County: Fleming-Kimbell 2 M. K. Graham, SE NE Sec. 2012, T.E.&L. Sur., 4½ mi. NE Murray, I.P. 110 bbl., pay 4,298 ft., T.D. 4,325 ft.

Wichita County: A. R. Dillard 1 T. R. Boone, 330 ft. from S, 1,032 ft. from W, Blk. 2, Kemp's subd., Wm. Myer Sur., dry, T.D. 5,552 ft.

Montague County: Geo. L. Pace 1 G. L. Miller, E. Maynard Sur., dry, T.D. 3,106 ft.

Cooke County: Bridwell Oil 1 W. H. Campbell, 694 ft. from N, 5,556 ft. from W, O. F. Leverett Sur., 4 mi. NE Munester, dry, T.D. 1,645 ft.

Archer County: Akin & Dimock 1 D. H. Skinner, 1,416 ft. from E, 1,341 ft. from S, J. W. Harris subd., 8 mi. W Archer City, dry, T.D. 1,500 ft.

WEST CENTRAL TEXAS

ABILENE, Tex.—A new pool for Runnels County was indicated at L. E. Hults 1 C. C. Gray, Section 147, E.T. RR. Survey, 1 mile south of the Beddo pool, which produces from about 2,300 ft. Shows of oil were found in the Gunsight lime from 2,827-35 ft., and 2,848-53 ft and operator was preparing to set pipe to test. Total depth is 2,859 ft., with elevation of 2,727 ft.

In Jones County, Great Lakes Carbon 1 Hardy, 660 ft. from south and east lines Section 11, Block B, H.&T.C. Ry. Survey, 2½ miles west of Reid pool and 7 miles north of Anson, had show of oil in Gunsight lime from 2,626-40 ft., but was drilling ahead to the Ellenburger, or to finish 6,000-ft. contract.

The second producer for the Lawson pool, Haskell County, in the J. M. Cass Survey, 5 miles east of Haskell, was assured when E. C. Lawson 1-B Rose flowed 31 bbl. 41-gravity oil in 55 minutes through perforations 2,800-11 ft. in the Adams Branch lime. The first well in the pool was completed in November 1941 for 86 bbl. per day from 2,664 to 3,002 ft., and dry holes have been drilled offsetting to south and west.

WEST CENTRAL TEXAS WILDCAT COMPLETIONS

Comanche County: Crabb & McNeel 1 Walter Henderson, E.T.R.R. Co. Sur., dry, T.D. 732 ft.

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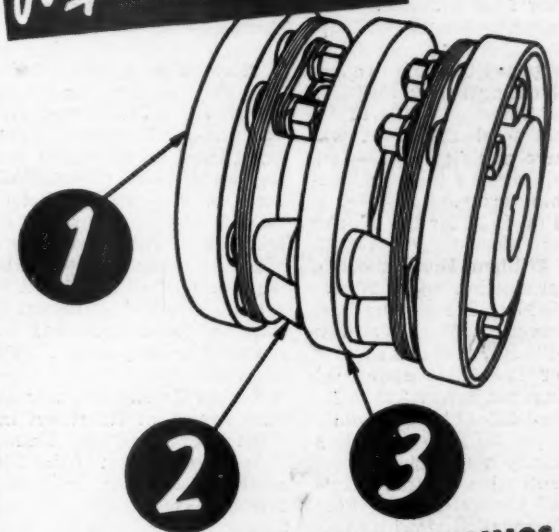

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T-2

LOUISIANA GULF

Two Oil Fields and Major Extension Are Recorded

NEW ORLEANS, La.—Two new oil fields and a major extension to Pine Prairie Wilcox production featured the Louisiana Gulf Coast district development, with 15 tests located. In Iberville Parish, Sugarfield Oil Co. 1 Iberville Mortgage & Loan Co. opened the Rosedale prospect to oil production. This test, in 74-7s-10e, was taken over from Humble, Humble having abandoned the well in May 1939 after drilling to 10,025 ft. Sugarfield deepened the hole to about 10,500 ft., set casing below 10,400 ft. and then perforated at 10,009-12 ft., above the old total depth. It was brought in here and flowed 198 bbl. of pipe-line oil per day through 7/64-in. choke, tubing pressure 1,300 lb.

The second oil field for the district was opened by Falcon-Seaboard Drilling Co. and William Helis about a mile east of production in the Northeast Gibson field in Terrebonne Parish. The discovery well, 1 Jackson estate, in 17-17s-15e, was drilled to a total depth of 10,600 ft., casing set and perforations made at 9,280-90 ft., where it flowed 225 bbl. of oil daily through ⅛-in. choke. This production is from an entirely new horizon.

A major extension to the west-flank Wilcox production at Pine Prairie in Evangeline Parish was established when Pan American Production Co. completed 3 Crowell Land & Mineral Corp., 35-3s-1w, with perforations at 10,514-30 ft. and 10,440-70 ft. On preliminary tests, it flowed 22.3 bbl. oil hourly through ¼-in. choke, with tubing pressure of 1,010 lb., gas-oil ratio 915-1. Total depth is 30,693 ft.

St. Landry Parish.—Humble Oil & Refining Co. 1 Virginia Prince et al, 25-6s-6e, ½ mile southwest of Gulf Refining Co. 1 Haas-Hirsch, discovery well in Krotz Springs area, was spudded. A new test for the Krotz Springs area is Texas Co. 1 Charles H. Swift, in 14-6s-7e, 660 ft. from the north and east lines of the section, contracted to 10,500 ft.

Ascension Parish.—Robert Y. Walker has staked location for 1 Realty Operators, in 1-11s-3e.

Acadia Parish.—Continental Oil Co. completed a producer on the north flank of the Richie field, north of the north-flank discovery well. Details are lacking, but the well at plugged-back depth of 8,635 ft. flowed 114 bbl. of oil daily through 6/64-in. choke.

Cameron Parish. — Continental Oil Co. staked location for 1 A. Hebert, and is rigging up, in the Big Lake area, 13-12s-9w.

LOUISIANA GULF COAST WILDCAT

Vermilion Parish: Humble Oil & Ref. Co. 3 Louisiana Furs, Pecan Island area, 43.70 bbl. distillate through ⅞-in. choke, T.P. 3,425 lb., S.I. T.P. 3,800 lb., gas-oil ratio 75,720, perf. 10,279-94 ft., T.D. 11,623 ft.

SOUTHWEST TEXAS

New, Deeper Sand Opened Southwest of Placedo

CORPUS CHRISTI, Tex. — New, deeper pay sand was opened southwest of the Placedo field in Victoria County by Superior Oil Corp. of Oklahoma 1 Joe Sklar, 2 miles southwest of Placedo townsite and 1,600 ft. southeast of the railroad. Perforated at 6,699-6,702 feet in the top part of the sand logged from 6,698-6,716 ft. it flowed 97 bbls. per day through 5/64-in. choke, after having flowed an estimated 180 bbl. per day on a ⅛-in. choke. Tubing pressure on the smaller choke was 675 lb. and casing pressure 1,300 lb. Tanks are being built before running Railroad Commission potential. Total depth is 7,010 ft. The fast drilling pace continues in the Southwest Texas district, 37 new locations being announced in the past week. Twenty are wildcats.

Nueces County.—A new deeper pay was proved at Robstown in Sam E. Wilson, Jr., 2 E. W. Naumann, 990 ft. south-southwest of the 1 Naumann, south of previous production. After drilling to total depth of 7,505 ft. with no show in the regular 5,200-ft. discovery pay, a new sand at 7,141-46 ft. was perforated and the well flowed 80.73 bbl. daily through ⅛-in. choke, with tubing pressure 600 lb., casing pressure 1,800 lb. and gas-oil ratio 1,250. The 5½-in. casing was set at 7,230 ft.

Bee County.—New development for the recently opened Blanconia oil field included locations by Pure Oil Co. and Stanolind Oil & Gas Co. Pure's new test is 1 Tom May, 3,700 ft. southwest of the 1 Tom Williams oil discovery. Stanolind's new operation is 1 Cyrus Fox, 1,120 ft. southwest of the Pure oil discovery well. Both are 5,000-ft. tests.

De Witt County.—Sohio Producing Co. has entered the play in De Witt County, to drill 1 First National Bank of Yorktown as a 9,500-ft. Wilcox wildcat on an Adams Oil & Gas Co. farmout.

Refugio County.—P. R. Rutherford has set 5½-in. casing in the 1 Weiss (Zengerle) prospective field opener 1¾ miles northeast of the LaRosa field. A drill-stem test at 6,187-90 ft. recovered about 9 stands of oil and 2 stands of salt water. Completion will be made in the upper part of the sand.

Jim Wells County.—An exceptional producer was completed by Edwin M. Jones in the 2 M. A. Evetts, new sand discovery well in North Magnolia City field. The well gaged 943.92 bbl. of 30.7 gravity pipe-line oil in 24 hours through ⅞-in choke, tubing pressure 700 lb., casing sealed. Total depth 5,474 ft.

LOWER GULF COAST WILDCAT COMPLETIONS

Bee County: Hewitt & Dougherty 1 Cleo Dubois, 3 mi. W SW of Pawnee, dry at 7,010 ft.

Jim Wells County: Highland Oil Co. 1 J. G. Winters, 2 mi. SW of Alice townsite, dry at 5,643 ft.

W. L. Goldston et al 1 Reed & Lindsay, 1 mi. N of Alice field oil production, estimated 28,000,000 cu. ft. gas, open flow through ⅛-in. choke, with spray of condensate, T.P. 1,850 lb., C.P. 1,900 lb., perf. 5,282-86 ft., T.D. 5,575 ft., shut in.

SOUTH TEXAS WILDCAT COMPLETIONS

Webb County: Dulup Oil Co. 2 J. G. Garcia, 3 mi. N of Dulup field, dry at 1,915 ft.

Duval County: C. H. Lewis 1 Mrs. Rosa W. de Benavides, 4 mi. E of Bruni, in Cole area, dry at 3,513 ft.

TEXAS GULF COAST

New Oil Field in Prospect In South Anahuac Area

HOUSTON, Tex. — A new oil field for the Texas Gulf Coast district is indicated in Standard Oil Co. of Texas and Salt Dome Oil Corp. 1-21D State-Trinity Bay, Trinity Bay, in the South Anahuac area of Chambers County. It is about ½ mile west of Rowan Drilling Co. 1 Land gas-condensate well. The 1-21D was drilled to a total depth of 9,180 ft., 7-in. casing set on bottom and pipe perforated from 9,093-98 ft. Last report available was that it was still testing, flowing 3 to 5 bbl. of pipe-line oil per hour through a small choke.

Glenn H. McCarthy, of Houston, expanded his wildcat operations during the past week. He staked 1 R. S. Stanger, on an 862-acre lease on Stanger's Mound in Brazoria County, 6 miles southeast of West Columbia, to go to 10,000 ft.; and located 1 F. H. Carpenter estate, 3½ miles south of Sour Lake, in the extreme northwestern part of Jefferson County, to drill to 10,000 ft. At Hitchcock, Mr. McCarthy will go back in the 1 Maco Stewart, which he drilled earlier in the year to 7,781 ft., where he encountered heaving shale. This test, on the east flank of the dome, will be carried to 11,500 ft. Another wildcat which Mr. McCarthy intends to deepen is the 1 J. T. Shelby, 3 miles south of Nederland, Jefferson County. This test was abandoned in February this year at 10,017 ft. and now will be deepened to 12,000 ft.

Fort Bend County. — Stanolind Oil & Gas Co. has perforated for a test in the 5 Cinco Ranch Co., north-extension test at Clodine field, about ¼ mile north of the 2 Cinco producer. Total depth is 7,504 ft. in sand, with

ONE THING FOR SALE ...THREE FOLKS TO BUY
AND SO THE PRICE GOES UP SKYHIGH!
WITH PRICES HIGH YOU WANT A RAISE -
THAT STARTS A GREATER SPENDING CRAZE!
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1. Buy only what you really need	**2.** Pay no more than ceiling prices... buy rationed goods only with stamps	**3.** Pay off old debts and avoid making new ones	**4.** Support higher taxes ...pay them willingly	**5.** Provide for the future with adequate life insurance and savings	**6.** Don't ask more money for goods you sell or work you do	**7.** Buy all the War Bonds you can afford — and keep them

Keep prices down...use it up, wear it out, make it do, or do without

This advertisement, prepared by the War Advertising Council, is contributed by this magazine in cooperation with the Magazine Publishers of America.

5½-in. casing set on bottom, to try for completion in the 7,500-ft. field pay sand.

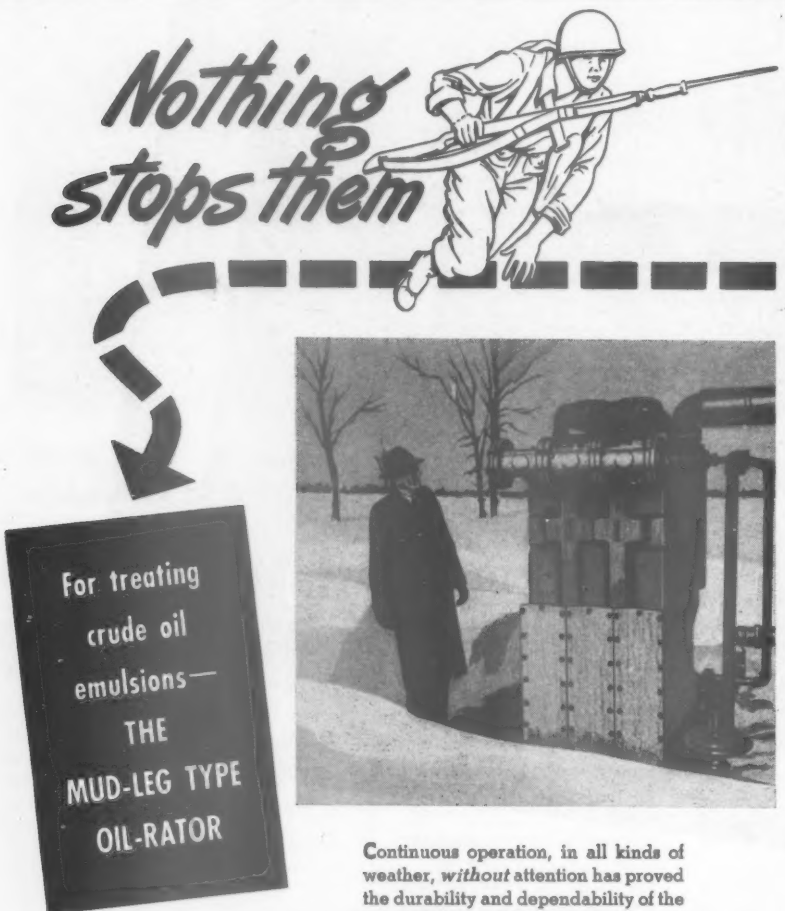
A new deep test for Fort Bend County is H. M. Naylor Oil Co. 1 V. S. Randle, about 1½ miles east of Richmond, to be drilled to 10,000 ft.

Jefferson County.—Rowan Drilling Co. 1 L. B. Broussard, wildcat 4 miles east of the Fannett field, failed to show anything on first test in perforations 8,550-54½ ft. New perforations were made at 8,554-59 ft. and a new test is under way.

Wharton County.—Seaboard Oil Co. of Delaware has entered the wildcat play in the upper coastal district, locating 1 W. W. Duson in the Danevang area of Wharton County, 4½ miles northeast of Danevang. This is a proposed 7,000-ft. test.

Humble Oil & Refining Co. 1-B Duncan, in the Spanish Camp area is drilling below 7,300 ft. in shale. Salt Dome Oil Corp. is rigging up the 1 A. G. Menefee et al wildcat, 5½ miles northwest of Louise. Pan American Production Co. spudded the 1 J. Brooks Gary, southwest flank of Boling dome, and is drilling below 700 ft.

Chambers County.—Wynn Crosby Drilling Co. and Kirby Petroleum Co. failed to find commercial shows in 1 Canada & Smith, drilled to 9,019 ft., and the test has been abandoned.



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TEXAS GULF COAST WILDCAT COMPLETIONS

Chambers County: Wynn Crosby Drilling Co. and Kirby Petroleum Co. 1 Canada & Smith, 2 mi. E of Jackson Pasture discovery well, dry at 9,019 ft.

Fort Bend County: B. W. Trull and M. Thompson, in Long Point area, NE of Guy, dry at 3,568 ft.

Galveston County: Jack W. Frazier, Ray Ranger and Weber Ogden 1 C. L. Cooper et al unit, NE of Algoa townsite, dry at 9,508 ft.

Jackson County: W. L. Pickens 1 John Kramer, 6,000 ft. ESE of Maurtiz field production, Morris & Cummings Sur. 34, A-301, 140 bbl. through 7/64-in. choke; T.P. 760 lb., C.P. 960 lb., gas-oil ratio 393, perf. 5,703-09 ft., T.D. 6,850 ft. Discovery, field named Little Kentucky.

Humble Oil & Refining Co. 1 E. T. Rose et al, 5 mi. SW of Edna, in El Toro area, dry at 6,898 ft.

Jefferson County: Sun Oil Co. 1 B. E. Quinn, in Helbig area, N of Beaumont, temp. abandoned at 8,300 ft.

MICHIGAN

Deep Sylvania Test Fails Along With Seven Others

SAGINAW, Mich.—A Sun Oil Co. test of the Sylvania formation, more than 1 mile deep, was among the eight successful wildcats completed during the past week in six scattered counties of Michigan. Sun drilled C-1 Davy, Section 29, Osceola Township, to 5,315 ft. Also dry was C. T. Teater-Americrude Oil Co. 1 Nelson, Section 24, LeRoy Township, Osceola County, where drilling stopped at 3,832 ft. Although there was an oil show, with salt water, between 2,675-80 ft., Acme Drilling Co. 1 Dolbozq, Section 18, Huron Township, Wayne County, also was completed as a dry wildcat at 2,680 ft.

Another good producer in the Fork field of Mecosta County was the chief source of new production. Elsewhere two smaller producers and one minor natural-gas well, were brought in.

Operators in the Reed City field are awaiting state Oil Advisory Board deliberations relative to new restrictions on production there.

MICHIGAN WILDCAT COMPLETIONS

Allegan County, Fillmore Township: Del Fortney-C. W. Cook 1 Gerrit Bolks, SE NE SE 25-4n-15w, dry, T.D. 1,638 ft.

Martin Township: W. H. Clock 1 Hugh MacVean, SE SW SW 9-2n-11w, dry. T.D. 1,795 ft.

Mecosta County, Deerfield Township: C. L. Maguire, Inc., 1 D. C. Blair, SW SW NE 8-13n-9w, dry, T.D. 3,650 ft.

Osceola County, LeRoy Township; Charles W. Teater-Americrude Oil Co. 1 Nels Nelson, C S½ SE SW 24-19n-10w, dry. T.D. 3,832 ft.

Osceola Township: Sun Oil Co. 1-C V. R. Davy, C N½ NW NW 29-18n-8w, dry in Sylvania, T.D. 5,315 ft.

Van Buren County, Bangor Township; Harris Oil Co. 1 A. D. Chokas, NE SW SW 11-2s-16w, dry, T.D. 1,040 ft.

Wayne County, Huron Township: Acme Drilling Co. 1 Bertha Dolbozq, NE NE NE 18-4s-9e, dry in Trenton, T. D. 2,684 ft. (oil and salt water show at 2,675-80 ft.)

Wexford County, Henderson Township:

Midwest Refineries, Inc., 1 William L. Kellogg, C N½ NW NW 34-21n-11w, dry, T.D. 1,440 ft.

EASTERN TEXAS

Titus County Wildcat Said To Have Showing of Oil

DALLAS, Tex. — The most closely watched wildcat in the East Texas district is Humble Oil & Refining Co. 1 Hogue, Humphries Survey, almost on the line of Titus County. Unconfirmed rumor is that the test has encountered good oil shows, and at last report the total depth was 7,475 ft., drilling ahead. Only reported oil shows were in a core from 7,127-47 ft., but a drill-stem test in this section showed only 20 ft. of mud with no pressure. Outcome of the Humble 1 Solon King, New Hope outpost, soon will be known, as it is coring near the expected pay section below 7,400 ft.

Harrison County. — Siosi Oil Co. 1 Lindsay, Daniel House Survey, was reported to be in the Travis Peak lime, and outcome will be know in the next few days.

Henderson County. — The new oil discovery in the Tri-Cities field, Stanolind Oil & Gas Co. 1-E Tri Cities unit, was shut in 46 hours at a total depth of 7,680 ft. and swabbed 58 bbl. of oil and 23 of water.

Hunt County.—Failure for the new Campbell Paluxy sand pool was recorded at Stanolind 1 Whitten, southwest of the discovery, which was abandoned at 4,417 ft. after running electric log. Humble 1 Rutherford was drilling below 9,520 ft.

Morris County.—Humble Oil & Refining 1 Wright, southwest of Omaha, was drilling below 9,600 ft. after passing through the Travis Peak and Cotton Valley sections. The Smackover is the objective of this test.

Rains County.—No shows have been reported from Humble 1 Mainard in drilling to 8,215 ft.

Smith County.—Two new producers for Chapel Hill pool were recorded. Sinclair Prairie Oil Co. 1 L. Rudman, on west side of the pool, was completed for 66 bbl. distillate and 7,000,000 cu. ft. gas from Pettit lime, and Texas Co. 2 Phillips, north side of field, registered an initial flow of 178 bbl.

Van Zandt. — Superior Oil Co. 1 Groves had small show of oil in the Travis Peak from 8,565-95 ft., and was running electric log.

EAST TEXAS WILDCAT COMPLETIONS

Henderson County: Continental Oil 1 Palmer estate, 330 ft. from N and W 80-ac. tract, R. D. Palmer Sur., 5¼ mi. SW LaRue, Pecan Gap 2,960 ft., Austin 4,060 ft., Eagleford 4,340 ft., Woodbine 4,746 ft., dry, T.D. 5,040 ft.

Fohs Oil 1 E. P. Harwell, 650 ft. E, 330 ft. N of NW cor. James Duncan Sur., but in Henry Jeffreys Sur., elev. 356

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ft., Austin 2,125 ft., Eagleford 2,657 ft., Woodbine sand 3,110 ft., dry. T.D. 3,382 ft.

ROCKY MOUNTAIN

Amerada's Clark Lake Prospect Showing Oil

DENVER, Colo.—The Amerada Petroleum Corp. wildcat on the Clark's Lake structure, Larimer County, northern Colorado, picked up a sand at 5,897 ft., and 5 ft. of core from that depth to 5,902 ft. showed good saturation. Scouts for most of the oil companies in the region have gone to the well and details of the strike are not yet available. The location is 1 Hartshorn, SE NE SW 15-9n-68w, approximately 3 miles southeast of the Wellington field which was discovered by the Union Oil Co. of California in 1923 when it brought in a gasser making 80,000,000 cu. ft. a day. The gas caught fire and the well was out of control for about 3 months. This resulted in a reduction in pressure to such an extent that water channeled into the sand and although the field has produced more than 5,000,000 bbl. to date, its output failed to come up to the original expectations. The producing horizon at Wellington is the Muddy sand at 4,200 ft.

When the Amerada well spudded, it was expected to go to around 7,000 ft., which would permit the exploration of the Muddy and the underlying sands, the Dakota and the Lakota. Amerada did extensive geological and geophysical work in that area in 1935, taking in the district along the mountain range as far south as the old Boulder field. The oil fields along the front range are located on the western rim of the Denver basin and are in line with the Horse Creek discovery of the General Petroleum Corp. in Southeast Wyoming last year.

Little Buffalo basin tests. — One of the two deep tests drilling on the Little Buffalo basin structure in Park County, Wyoming, has reached a critical stage and results in the Tensleep may be known within the next few days. The two wildcats are being closely watched, not only because of the possibility of opening another black-oil field in deeper pays, but to check predictions, practically unanimous, that the Tensleep will be productive. The structure has been producing gas in the Frontier sands at around 1,400 ft. for nearly 30 years, but has never been tested in the deeper horizons, and offers definite possibilities of repeating the results achieved at Elk Basin.

The well drilling at a critical depth is Fred Goodstein 1 Pedley-Government, NE NE NW 13-47n-100w, on the east dome. The Stanolind well is on the west dome. The Goodstein well is drilling at 4,765 ft. in hard dry lime. If the formations correlate with those at Elk Basin, the Tensleep may be encountered at around 5,170 ft. The Embar lime, which is productive in most all of the Big Horn basin fields, lies just above the objective Tensleep. The Embar marker, which consists of grayish green shale, was encountered in the Goodstein well at 4,570 ft., and the top of the lime was picked up at 4,620 ft. The cores showed slight saturation at the top, but dry lime below, which some interpret as meaning that horizon may contain gas as no water was encountered. No test was made. Elk Basin, Oregon Basin, Frannie and Byron, unlike the Garland Dome, have no gas caps in either the Embar or Tensleep.

Continental at Gebo. — The Continental Oil Co. 1 Gebo unit, SW NW SE 23-44n-95w, Gebo dome, Hot Springs County, Wyoming, a discovery in the Embar, reported 2 weeks ago, reached the top of the Tensleep at 5,057 ft., and stopped at 5,065 ft. to run the 7-in. before drilling into the objective horizon. Connections are being installed and preparations made for any eventuality.

Discovery in Sublette County.— H. H. Howell 2 Noble, SW NW NW 11-29n-113w, on South Piney Creek, western Wyoming, although in a district where considerable shallow drilling has taken place for many years with small shows of oil, is classed as a wildcat. It made 15 bbl. per day from a sand in the Tertiary at 943-48 ft. A remarkable feature of the discovery is that the oil tested 74.8° A.P.I. and is being sold for tractor fuel at $4.20 a barrel. The location is ¾ mile east of a deep test drilled to 3,056 ft. in 1939 by the Wyoming Petroleum Corp. which had gas in shallow horizons, but had not reached its objective when drilling was suspended.

CANADIAN FIELDS

Alberta Activity Shifts Toward Montana Border

CHATHAM, Ont. — Drilling activity in Alberta is showing a decided shift toward the border areas, north of the Montana boundary. Royalite Oil Co. has located Imperial-Erickson Coulee 1 in LSD 6, 7-1-12w4, to test holdings of 19,939 acres secured in the Erickson Coulee area, near Clarinda and east of Coutts. In this area, in 1925, a test by Northwest Co., Imperial Oil subsidiary, in LSD 13, 8-1-12w4, not far from the present location, was drilled to 3,570 ft. and plugged back to 2,576 ft. for gas production, estimated at 10,000,000 cu. ft. daily.

About 12 miles east of Imperial-Erickson Coulee 1, McColl-Frontenac Oil Co. has location on the Pinhorn dome in LSD 6, 8-1-8w4. This is on the opposite side of the border from A. B. Cobb and E. B. Coolidge Northern Farms 2, which is a producer in the Cut Bank sand, and is preparing to deepen to test the Madison limestone, the two wells being on opposite ends of the same international structure.

Del Bonita. — On the Del Bonita structure, southern Alberta, Pacific Oil & Refining 1, LSD 12, 18-1-21w4, got the lime high at 4,971 ft. with heavy gas pressure and a small oil show at the contact. The well is casing off the gas to deepen into the oil horizon of the lime.

Ram River.—A recent report from the Ram River-Clearwater area states that Ram River 2, LSD 8, 1-37-11w5, is now estimated good for 150 bbl. daily. The well is closed in and builds up to 800 lb. pressure. Roads and bridges are being constructed to facilitate the moving of equipment for Ram River 3, at which time No. 2 will be placed on steady production.

Pouce Coupe.—In the Pouce Coupe field, in the northern Alberta foothills about 20 miles from Dawson Creek, derrick is up for Alaska Highway Oil & Gas 2, location being about 3 miles southwest of No. 1 gasser, which developed a flow around 19,000,000 cu. ft. daily around 2,600 ft. The new location is about 60 ft. lower on the south flank of the structure.

Jumping Pound. — In the Jumping Pound area, west of Calgary, Shell-Norman 1, LSD 5, 22-24-5w5, is below 11,921 ft. after getting the Madison limestone at 11,588 ft. with no marked indication of porosity in the limestone.

Athabaska.—In the Athabaska field in northern Alberta, Deca 1, LSD 1, 4-66-22w4, has been abandoned, owing to difficulty in cementing for a production test at 1,380 ft. Cellar is being dug for Deca 3 at a new location in LSD 10, 15-66-23w4. Deca 1 got the producing horizon higher than Deca 2, the discovery well, which had gas production around 1,671 ft.

Turner Valley.—The entire outlook for Turner Valley drilling may be revolutionized as a result of the completion of Northwest-Hudson's Bay 13, LSD 9, 8-21-3w5, as a producer bottoming at 9,435 ft. The test got the first Madison limestone at 7,255 ft. and after drilling upper and lower porous faulted back to the upper formations, later encountering a recurrence of the Madison at 9,012 ft. with a further upper and lower porous. The second sequence, starting 4,934 ft. below sea level, is producing around 300 bbl. daily.

As a result, drilling is to be resumed at Northend Petroleums 1, LSD 12, 9-21-3w5, suspended some months ago at 8,949 ft. after getting the Madison limestone at 8,928 ft., or 4,936 ft. below sea level.

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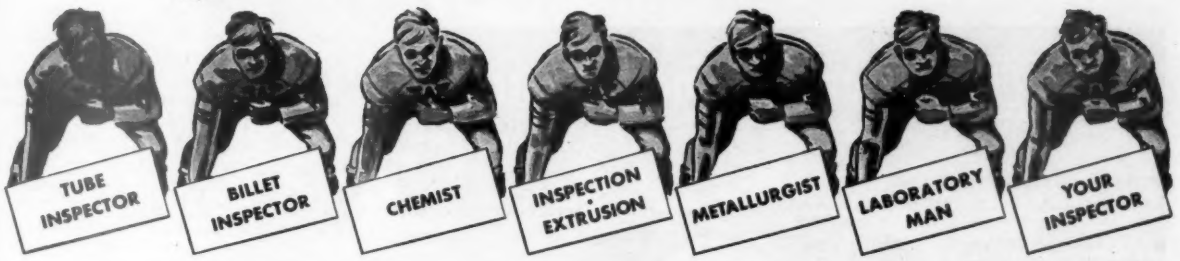

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CALIFORNIA

Burrel Area Discovery Producing From Miocene

LOS ANGELES, Calif.—General Petroleum Corp. discovered a new oil field in the Burrel district of Fresno County this week when 68-35 Burrel in 35-16s-18e was brought in flowing 342 bbl. of clean 31.7-gravity oil per day through a 12/64-in. bean from a Miocene sand at 6,484-96 ft. General's new well is producing from the equivalent of the Miocene sand that has been found in the Helm, Riverdale and Lanare fields in the same general area. The well was carried to 6,660 ft., then cleaned out to 6,507 ft. after being plugged back and the 7-in. casing perforated opposite the interval open to production.

Despite a favorable production of crude oil in General's Burrel wildcat it is only producing 15,000 cu. ft. of gas per day which leaves some question as to the importance of the find from an ultimate recovery standpoint. General has been especially active in this section of Fresno County and recently completed 4-5 Noble, an outpost in the eastern end of the Helm field, as a condensate well. When this well was first completed it showed an initial of 3,040,000 cu. ft. of gas and a spray of oil, but a few days later it was given a test and produced 255 bbl. of 59.9-gravity condensate through a 17/64-in. bean. This well is producing from perforations at 7,904-08 ft., 7,923-58 ft. and 7,968 to 8,025 ft. The Kreyenhagen was cored at 7,535 ft., the Domengine at 7,933 ft. and top of the Paleocene at 7,939 ft.

The performance of this well and on the character of previous compltions by Amerada, which discovered the field, Helm is definitely a distillate field and will invite the installation of a recycling unit similar to that in the Paloma field.

Superior Oil Co. is preparing to drill a second well west of the discovery in the Lanare field which is a few miles southeast of Helm and will probably have it ready for a production test within another 30 days. It is not at all improbable that Lanare may prove productive up to within a very short distance of the Helm field although General Petroleum drilled and abandoned a Cretaceous test between Helm and Lanare in 9-17s-17e.

Kern County.—The most promising wildcat under way in California is Union Oil Co. 81-8 Kernco, west of the Reo Bravo field in 8-29s-25e. Oil and gas showings were noted on the ditch while drilling at 9,690 ft. and although core recovery has been exceedingly poor, indications are that a sand has been found.

Southern San Joaquin Valley.—Richfield Oil Corp. which has drilled four dry holes in the Tejon district of southern Kern County has had some interesting showings in its fifth test. The company's Tejon wildcat has found some oil sand in what is believed to be the Chance at 2,375 ft. Richfield has been sold on the possibilities of the Tejon district for several years and had one well south of the Wheeler Ridge field that produced for some time before being abandoned. Barnsdall Oil Co. also tested the Tejon area but pulled out of the district after drilling a dry hole. Proxmity of mountains in the Ridge Route area makes seismograph work very difficult and interpretations may vary to a substantial degree. Richfield has a pipe line from Elk Hills to Los Angeles harbor which could handle Tejon production.

CALIFORNIA WILDCAT COMPLETIONS

Burrel, Fresno County: General Petroleum 68-35 Burrel, 35-16s-18e, flowed 342 bbl 31.7 gravity, 0.9 per cent cut, 151,000 cu ft. gas, 12/64-in. bean, pressures 500/860 lb., T.D. 6,660 ft. P.B. 6,507 ft., gun-perf. 6,484-96 ft., finished in equivalent of Clover zone of Miocene age, completion of this well opens up new field.

Jasmine wildcat district, Kern County: Barnhart-Morrow Consolidated Oil Co 1 Quinn, 15-25s-27e, abandoned in granite basement 2,823-36 ft., T.D. 2,836 ft. cored poor oil sand 2,783-2,808 ft., no test made of showing.

Temescal wildcat district, Ventura County: Texas 57-1 Dominguez 1-4n-18w, abandoned in gray sand, T.D. 7,308 ft., form test 4,210-47 ft. recovered 400 ft. mud showing no oil or gas, bottomed in Sespe of Miocene age.

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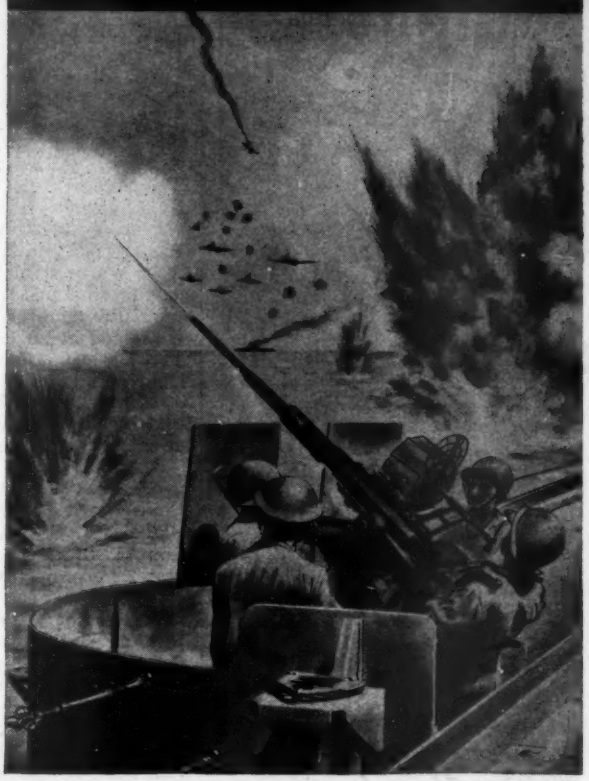

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PERMIAN BASIN

Pecos and Howard Promise Three Discovery Producers

MIDLAND, Tex.—Three new fields were in prospect in the West Texas district as the week ended, two being in Pecos County and one in Howard County.

In Pecos County, Bryce McCandless 1-101 Atlantic Refining Co., SE SW Section 101, Block 11, H.&G.N. Ry. Survey, ½ mile southeast of Owego, 7 miles west by north of the Wentz pool and 8 miles southeast of Apco-Warner Ellenburger pool, indicated production possibilities from the Tubb zone of the Permian when it hit gas in an estimated volume of 20,000,000 cu. ft., with a spray of oil from porous and saturated lime from 3,380 to 3,460 ft. Efforts will be made to kill the gas and carry the well down to the original objective, Ellenburger.

A new shallow field for Pecos County was assured at E. Russell Lloyd 1 E. C. Powell, W¼ S¼ Section 76, Block 10, H.&G.N. Ry. Survey, 2 miles northwest of the Masterson shallow pool, and only ¼ mile northwest of an abandoned producer at total depth 2,431 ft. The new well flowed 65 bbl. by heads from pay 1,659-61 ft., and is estimated to be good for 40 bbl. per day.

Western Howard County may receive a new field at John B. Hawley, Jr., 1 J. W. Cook, SE NW Section 23-34-1n, T.&P. Ry. Survey, 5 miles north by west of the Brindley area. The test topped San Andres lime at 3,045 ft., drilled to total depth 3,555 ft., plugged back to 3,300 ft., and shot with 750 qt. from 3,143 to 3,292 ft., after which the hole filled 1,135 ft. with oil. The operator now has moved 1¼ miles southwest to drill 1 H. H. Wilkinson, SW NE 33-34-1n, T.&P. Ry. Survey.

WEST TEXAS WILDCAT COMPLETIONS

Mitchell County: M. L. Richards 1 E. E. Erwin, NW NW Sec. 1, Blk. 25, H.& T.C. Ry. Sur., 4½ mi. E Vincent pool, sat. and por. 3,840-87 ft., show gas, T.D. 4,253 ft. Old well drilled deeper from T.D. 3,063 ft.

Pecos County: Pittman & Atkins 1 University, 660 ft. from N, 1,070 ft. from E, Sec. 1, Blk. 17, University Sur., elev. 2,736 ft., dry, T.D. 1,793 ft.

SOUTHEAST NEW MEXICO

HOBBS, N. M.—Seeking to further extend the producing limits of the Maljamar pool to the east, Barney Cockburn was rigging up 1 Wyatt, SE SE 33-17s-33e, 2 miles southeast of nearest production and 1¾ miles north of Corbin 2-well pool, and the same distance southeast of the Philmex producer. The location is offset on the east by a dry hole, total depth 5,367 ft., drilled in 1928 by Henderson, Dexter & Blair. Another extension try, in Eddy County, is Paul B. English and Danciger Oil & Refining Co. 1 Stagner, NE NW 31-17s-31e, 1 mile southeast of production in the Grayburg-Jackson pool.

PANHANDLE

AMARILLO, Tex.—New field allowable is being sought for Hagy, Harrington & Marsh 1 M. J. Burke, NW SE Section 207, Block B-2, H.&G.N. Ry. Survey, Gray County, a semiwildcat in a gas-producing area, which was completed for 696 bbl. after 248-qt. shot from 2,873 to 2,895 ft. With elevation 3,247 ft., the well made 42-gravity oil with gas-oil ratio 555:1. Four other wells were completed, with a total potential of 539 bbl.

KANSAS

Development at Chitwood Promises Major Field

EXTENSIVE developments are under way at the new Chitwood Simpson sand pool, located in the southeast corner of Pratt County, some 6 miles southeast of Pratt. Lion Oil Refining Co.'s second well, a south offset to the discovery in NE NE SW 23-28-12w, found the pay zone at approximately the same depth as the 1 Chitwood and perforated from 4,413-16 ft. This second well was somewhat smaller than the first and its gas-oil ratio of 500:1 was much less. A temporary potential of 1,424 bbl. of oil was established, after making 24 bbl. an hour when drilled in.

There are now seven wells drilling, with at least 2 nearing completion. Nos. 2 and 3 Chitwood are both below 4,000 ft. but are continuing to test the Arbuckle. A number of major companies have tracts surrounding the discovery and the prospects are good for an important field. Although only 1½ miles from the nearest well in the Cairo gas field, the outlook is more for another pool on the order of the Cunningham oil and gas field. The 1 Chitwood completed in September, flowed 70 bbl. of high-gravity oil in 9 hours through ¼-in. choke and made potential of 2,672 bbl. in the Simpson at 4,396-99 ft. The gas-oil ratio was 7,000:1. A show of oil was also found in the Lansing and there was gas in the Viola. The Arbuckle lime, at 4,542 ft., was dry.

KANSAS WILDCAT COMPLETIONS

Jackson County: Gall & Towle 1 Dillaplain, SW NE 5-4-15e, dry, T.D. 3,045 ft.

Pratt County: Pryor & Lockhart 1 Barnes, NE NE NE 25-27-14w, dry, T.D. 4,582 ft.

Reno County: Marlyn Oil 1 Sittner, SW SW NW 4-22-12w, dry, T.D. 3,685 ft.

Russell County: Ingling & Parker 1 Marshall, NE NW 20-13-14w, dry, T.D. 3,447 ft.

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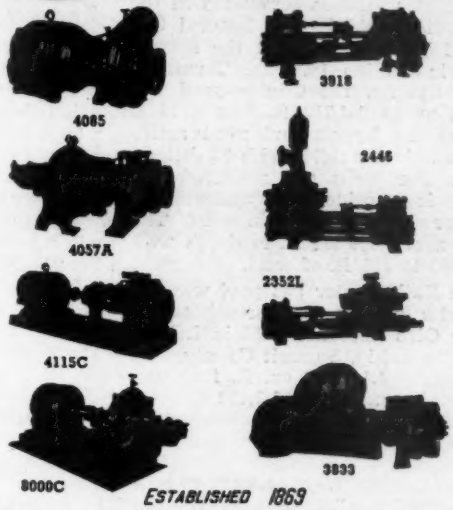

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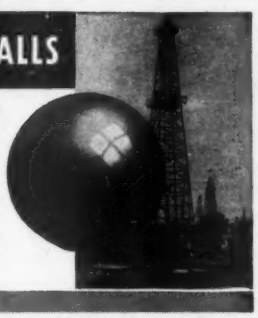

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OHIO, KENTUCKY

New Gas Well Added in Ohio's Sandyville Field

ZANESVILLE, Ohio.—A 3,108,000-cu. ft. well was completed in the Sandyville field by the Natural Gas Co. of West Virginia on the Russell tract in Section 16, Pike Township, Stark County. The Clinton sand was found at 4,642-4,718 ft. The field is one of the largest and most active of the Ohio gas fields with 20 drilling wells. The wells are scattered and there is considerable undeveloped acreage in the northern part. The wells average 4,800 ft. in depth with from 60 to 100 ft. of sand.

The Bath Center gas pool was extended a location to the southeast by Wiser Oil's Hostetler well in Lot 25, Bath Township, Summit County. The well gaged 1,118,000 cu. ft. from the Clinton, found at 3,392-3,450 ft.

Two additional oil wells were completed in the Stafford lime sand pool in Section 1, Franklin Township, Monroe County. Eight wells have now been completed, having a total initial production of 614 bbl. The wells average 1,240 ft. in depth with 15 ft. of sand.

OHIO WILDCAT COMPLETIONS

Meigs County, Salisbury Township: Proffitt 1 T. H. Leifheit, Fr. 12, shale 2,720-3,075 ft., 65,000 cu. ft., T.D. 3,096 ft.

Wayne County, Clinton Township: Ohio Fuel 1 M. Esselbaum, Sec. 12, Clinton 3,116-28 ft., dry, T.D. 3,178 ft.

Robinson 1 Walter Priest, Sec. 13, Clinton 3,132-42 ft., dry, T.D. 3,186 ft.

INDIANA

EVANSVILLE, Ind.—The largest initial producer yet found in the Owensville pool in Gibson County was completed in the past week. Superior Oil Co. 1 Paul Brazelton, SE NE NW 25-2s-12w, found pay in Cypress sand at 1,895-98 ft. and pumped 211 bbl. of oil and 59 bbl. of sediment and water after a 20-qt. shot. Four oil wells and one dry hole were completed in the state during the week.

INDIANA WILDCAT COMPLETION

Lake County: Peter Fox 1 M. A. Carsten, NE NE NE 5-32n-9w, dry at 2,438 ft.

WESTERN KENTUCKY

OWENSBORO, Ky.—Six oil wells and four dry holes were completed in western Kentucky during the week. All were in proven fields. Lacey & Wolf 1 Bauldorf, a wildcat, 4 miles west of Geneva and in Henderson County, had good oil saturation in Tar Springs sand at 1,873-87 ft., total depth 2,045 ft. A 1-hour drill stem test developed 175 ft. of clean oil, 25 ft. of oil-cut mud and 25 ft. of brackish water.

The best completion of the week was Gulf Refining Co. 8 H. H. Morehead in Henderson County, which started at 536 bbl. per day, on the pump, from Cypress sand at 2,293½-2,313 ft.

ILLINOIS

Edwards County Tests Hold Attention of Operators

CENTRALIA, Ill.—Forty-two completions during the week in Illinois fields included 26 oil wells, with a total initial production of 4,581 bbl., an average of 176 bbl. per well. Sixteen dry holes were reported. The only new productive spot opened was in White County where a 14-bbl. wildcat well produced from McClosky lime in 8-7s-8e.

Illinois Producing Corp. 1 Alfred Gaede, C E½ NE NE 9-1n-10e, in the Maple Grove field in Edwards County was good for 577 bbl. initially, producing from McClosky lime at 3,268-77 ft. The well flowed 631 bbl., 1,081 bbl., and 591 bbl. on successive days, and then pumped 369 bbl. and 208 bbl. per day.

In the East Barnhill pool in Wayne County, Cities Service Co. 1 Boggs, C W½ NW SW 33-2s-9e, started at 734 bbl. of oil and 50 bbl. of water from McClosky lime at 3,287-94 ft. and 3,314-28 ft., T.D. 3,365 ft.

A third unusually good well was Nash Redwine 1 Howard-Case, NE SW NE 6-3s-3e, in the Mount Vernon field in Jefferson County. It swabbed 570 bbl. a day after an acid treatment of McClosky lime at 2,801-10 ft. When put on the pump it produced 100 bbl. in 7 hours and was then shut down for repairs.

Attention was being directed to an area 4 miles northeast of Albion in Edwards County, where Superior Oil Co. 1 Lydia Lipper, NW NE SW 28-1s-14w, was drilling below 3,000 ft. Pay was indicated in both the upper and lower Cypress sands at 2,657-63 ft. and 2,704-19 ft. A drill-stem test recovered 690 ft. of oil and 90 ft. of oil-cut mud but no water. Considerable gas was developed. The well is 3 miles from other production.

Less than a mile east of Albion, and in Edwards County, Fred Noah was making a drill-stem test in 1 Poor Farm, NE SW NW 6-2s-11e, after coring McClosky lime. There was gas in the Levias (lower O'Hara) lime and 420 ft. of clean oil in the drill-stem test of that formation. This is an outpost to the Albion pool.

Magnolia Petroleum Co. and Ohio Oil Co. have been granted permits to deepen three wells to the Devonian lime in the Salem field in Marion County. They are Magnolia 105DD J. H. Young, SW 21-3n-7e, now drilling below 3,820 feet, and Ohio 36 Matthew Young heirs, SW 20-2n-2e, and 40 Matthew Young heirs, SW 20-2n-2e.

North of Bluford, Jefferson County, Mohawk Drilling Co., et el, 1 Pepple heirs, SW SE 13-2s-4e, swabbed 20 bbl. of oil per hour natural from the McClosky lime at 3,098 to 3,122 ft. Operators estimate the well good for 750 bbl.

ILLINOIS WILDCAT COMPLETIONS

Crawford County: Bell Bros. 1 Hill estate, SE SE NE 23-8n-13w, dry at 995 ft., unnamed sand at 864-76 ft.

Effingham County: Bell Bros. 1 H. E. Bushire, C NE SE 17-6n-6e, dry at 2,610 ft.

Franklin County: E. S. Adkins 1 Cambon-C, W. & F. Coal Co., NW NW SW 16-7s-2e, dry at 2,843 ft., upper Kincaid 1,689 ft., Cypress 2,341 ft., Aux Vases 2,640 ft., Fredonia 2,794 ft.

Jefferson County: George Allison et al 1 Jeff Oil & Gas, NE NE NE 32-3s-2e, junked at 2,532 ft.

Marion County: National Associated 1 W. F. Carter, SW NW SW 9-3n-4e, dry at 2,562 ft., Waltersburg 1,775 ft., Benoist 2,281 ft., Aux Vases 2,343 ft., no McClosky, St. Louis 2,547 ft.

Wabash County: R. L. Bauman 1 Corrie, NE SW NW 22-2n-13w, dry at 2,908 ft., Glen Dean 2,131 ft., Benoist 2,513 ft., Aux Vases 2,601 ft., no Benoist sand, Ste. Genevieve 2,676 ft., St. Louis 2,874-78 and 2,881 ft.

Wayne County: Gulf 1 Boggs, SW SW SW 36-2s-6e, dry at 3,460 ft., Glen Dean 2,714 ft., Ste. Genevieve 3,295 ft., lower Levias 3,307-12 ft., McClosky 3,386-90 ft.

White County: Smoky Oil 2 Delap, SE SW NE 8-7s-8e, pumped 14 bbl., McClosky lime 3,060-83 ft., T.D. 3,086 ft. Pool opener.

Smoky Oil 1 Sandy Run Lake Club, SE SW SE 7-7s-8e, dry at 3,253 ft., lower Kincaid 1,923 ft., Cypress 2,743 ft., Benoist 2,846 ft., Aux Vases 3,034 ft., McClosky 3,110-16 ft.

OKLAHOMA

Wilcox Discovery Will Set Casing for Flow Tests

CONFIDENCE in the new Wilcox strike in Cleveland County by Mid-Continent Oil Corp. at its 1 Edgar Harris, NE SE SW 29-10n-3w, is shown by the number of major oil companies leasing up all available tracts around the well. One company was reported to have purchased tracts totaling $300,000.

At the first of this week the well had not made a flow of oil, with the exception of that recovered on a drill-stem test. On this test, in the second Wilcox sand at 8,780-92 ft., total depth, it made gas in 1 minute and started to flow oil in 19 minutes, when it was shut in due to the high pressure. At the first of the week operators were having trouble when cuttings apparently filled the old hole. As soon as casing can be set to the pay zone production tests will get under way. Most operators feel that regardless of whether or not the well makes the 10,000-bbl. potential which is being talked of in some circles, its main importance is that it is the first Wilcox production west of the Nemaha ridge.

OKLAHOMA WILDCAT COMPLETIONS

Coal County: Continental Oil Co. 1 Morgan,

SE NW NW 3-2n-9e, dry, T.D. 6,355 ft., Caney 6,234 ft.

Comanche County: Northern Ordnance 1-D Stephens, SE NW NE 29-3n-10w, pumped 10 bbl. in 24 hr., T.D. 510 ft.

Noble County: Barnsdall Oil Corp. 1 Johnson, SW NE 25-22n-1e, pumped 14 bbl., second Wilcox 4,690 ft., T.D. 4,755 ft., P.B. 4,414 ft.

Payne County: Crosbie 1 Wilson, NW NE NE 28-19n-5e, dry, T.D. 3,872 ft., Prue 3,120 ft., Viola 3,770 ft., Wilcox 3,814 ft.

Tillman County, NW of W. Frederick pool: Burnham 1 Sargent, NE SW 26-2s-19w, dry, T.D. 5,456 ft. in Strawn.

LA.-ARK.

Cotton Valley Outpost Cores Distillate-Bearing Sand

SHREVEPORT, La.—In an unusually quiet week in the North Louisiana fields attention was centered on a test of the Ohio Oil Co. 1 Gleason, C NW NW 31-22n-9w, 2 miles northeast of the Cotton Valley field, in which a core at 8,468-88 ft. recovered 13 ft. of porous sand carrying gas distillate, and 6 ft. of black shale.

MISSISSIPPI WILDCAT COMPLETIONS

Adams County: The California Co. 1 National Gasoline Co., 1,725 from NE line and 1,825 ft. from SE line of 52-7n-1w, flowed 179 bbl., Wilcox 5,880-84 ft., T.D. 10,383 ft.

Lawrence County: W. Helis et al 1 T. H. Dinkins, 28-5n-11e, dry, T.D. 11,446 ft.

Wayne County: Gulf Oil Corp. 1 Aden Davis, NE SE 2-9n-9w, flowed 178 bbl., Tuscaloosa 6,666-72 ft., T.D. 7,100 ft.

WILDCATS AND DISCOVERIES

NINE new oil discoveries, a condensate well and two natural-gas producers were registered last week as the total successful results of exploratory drilling. Total discoveries, including oil, condensate and gas wells, were slightly less than 17.5 per cent of the reported completions. Fifty-one failures were removed from the list of active operations.

Possibly the most significant discovery was Humble Oil & Refining Co.'s wildcat in King County, North Texas, which flowed 361 bbl. of 33.1-gravity oil through ⅜-in. choke from the Cisco lime at 3,702-13 ft. Extensive possibilities exist for further exploration on the western flanks of the Bend arch, extending on west to the Permian basin. The other North Texas discovery was a new pay in a previously productive field.

The newly discovered area in Jackson County, lower Gulf Coast, has been named the Little Kentucky field. The discovery well has rated completion gage of 140 bbl. through 7/64-in. choke. Another indicated discovery is testing in Chambers County, South Anahauc area, at the rate of 3 to 5 bbl. an hour.

Southwest Texas' only discovery is a substantial gas well, 1 mile north of the Alice field.

The week's wildcat activity increased the total number of exploratory completions for the year to 2,813, a rate of 65½ wells per week, indicating that the most recent 7-day period was approximately normal in all respects. Oil well discoveries through the first 43 weeks of the year totaled 324, an average of 7½ per week.

Substantial production of 342 bbl. of 31.7-gravity oil through 12/64-in. choke was registered on completion gage of General Petroleum Corp. discovery in Fresno County, California, the only successful wildcat well reported from that state during the week. The well, however, showed practically no gas and this lack raised doubts in the minds of some engineers over the well's ultimate productive capacity.

Oklahoma's two wildcat completions were small wells in areas of scattered production. In the Elgin area of Comanche County, Hawley (Northern Ordnance) 1-D Stephens, SE NW NE 29-3n-10w, pumped 22 bbl. of oil the first 10 hours in a shallow sand at 500-10 ft. It was generally conceded to be a 25-bbl. well. It is probably the shallowest production in this immediate area and is farther south than any well in the vicinity. It continues the northwest trend from Lawton, Hanbury and Duncan.

Mississippi's important Tuscaloosa discovery, Gulf Oil Corp. 1 Davis, NE SE 2-9n-9w, in Wayne County, was completed for 178 bbl. of oil. This well is the first completion of three wildcats that have found production in the Tuscaloosa, stretching across the entire width of the state. An extensive area thus is opened for further testing. In Adams County, near the Mississippi-Louisiana line, California Co.'s 1 National Gasoline Co. flowed 179 bbl. of oil in the lower Wilcox at 5,880-84 ft. This was a deep test carried to 10,383 ft. and plugged back. It is the first Wilcox production for the state and ranks in importance with the Tuscaloosa discovery.

WILDCAT COMPLETIONS

	Week ended October 30, 1943					Cumulative total for 1943				
	Oil	Distillate	Gas	Dry	Total	Oil	Distillate	Gas	Dry	Total
Ohio	0	0	1	2	3	4	0	21	47	72
Indiana	0	0	0	1	1	3	0	0	49	52
Kentucky	0	0	0	0	0	19	0	2	105	127
Illinois	1	0	0	8	9	64	0	3	342	409
Michigan	0	0	0	8	8	10	0	1	132	143
Kansas	0	0	0	4	4	51	0	1	299	351
Nebraska-Missouri-Iowa	0	0	0	2	2	0	0	0	24	24
Oklahoma	2	0	0	3	5	39	1	17	221	278
Texas:										
North Central	2	0	0	8	10	49	0	1	300	350
West	0	0	0	1	1	10	0	1	69	80
Panhandle	0	0	0	0	0	0	0	0	5	5
East	0	0	0	2	2	5	0	2	89	96
Gulf Coast	1	0	0	5	6	6	7	6	97	116
Southwest	0	0	1	4	5	21	11	4	233	269
Total	3	0	1	20	24	91	18	14	793	916
Louisiana:										
North	0	0	0	0	0	5	0	3	59	67
Gulf Coast	0	1	0	0	1	12	7	1	26	46
Total	0	1	0	0	1	17	7	4	85	113
Arkansas	0	0	0	0	0	2	0	0	55	57
Mississippi and Southeast	2	0	0	1	3	5	0	0	53	57
Montana	0	0	0	0	0	4	0	1	21	26
Wyoming	0	0	0	0	0	6	0	0	15	21
Colorado, Utah	0	0	0	0	0	0	0	1	4	5
New Mexico	0	0	0	0	0	5	0	2	22	29
California	1	0	0	2	3	6	0	9	118	133
Total United States	9	1	2	51	63	326	26	76	2,385	2,813
Total previous week	10	0	1	52	63					

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Drilling Contractors

Allied Well Service Co., Houston, Tex., has received the contract from Stanolind Oil & Gas Co. for two dual-completion tests in the West Hackberry field, Cameron Parish, Louisiana. One is 24-B School Board C, and the other is 58-B State Lease 42, each in 16-12s-10w. Projected depth of each well is 9,800 ft.

Noble Drilling Co., Ardmore, Okla., and Houston, Tex., will drill for California Co. an 11,000-ft. test, 13 Delta Farms, in the Delta Farm field, La Fourche Parish, Louisiana. The location is in 31-16s-23e.

Danciger Oil & Refining Co., Tulsa, will drill another test for the California Co. in the Lake St. John area of Concordia Parish, Louisiana. This contract is for the 1 Killarney Community, 3,215 ft. south and 1,116 ft. west of the northeast corner of Section 15, but in 19-9n-10e. This well will be carried to 4,500 ft.

H. R. Miller has contract on the 1 Leon H. and Ruth H. Kleis, in SE NE NW 26-5n-15w, Ottawa County, Michigan.

Clyde Miller has contract on 2 Sage VerHoeven and wife, Herman S. Walters and wife Comm., in N½ SE SW 36-5n-15w, Ottawa County, Michigan.

Ashby Drilling Co. has been awarded drilling contract on the Gulf Refining Co. 1 Floyd Van Syckle, in C NE NE 18-16n-7w, Mecosta County, Michigan.

Dixie Drilling Co., Houston, Tex., has been awarded contract for Texas Co. 1 E. P. Brady, a proposed 11,000-ft. wildcat test in the Bayou de Fleur area, Jefferson County, Texas.

Mealy Wolf Drilling Co., Tulsa, has assigned a string of tools to drill 1 J. D. Turner, NW SW SW, 32-23-6e, Pawnee County, Oklahoma. Location is on a block assembled by Broswood & Demsey and the acreage extends across the Arkansas River into Osage County.

San Joaquin Drilling Co., Bakersfield, Calif., is making good progress on the repair job which the company is doing on Continental Oil Co. 1 Meyer in the Wasco, California, field which went to water several weeks ago. This well has been producing from 13,138 ft. and has 4¾-in. cemented at 13,059 ft.

R. H. Dearing & Sons, Dallas, Tex., this week progressed below 6,000 ft. on an 8,500-ft. contract for C. A. Andrade III 1 Sharpless, northeast Tarrant County, Texas, wildcat.

Taubert & McKee, Forth Worth, Tex., are drilling below 6,750 ft., looking for Bend formation, on Martin, Moore & Brewster 1 England, near Keller, in north Tarrant County, Texas.

O'Kane & Brain, Los Angeles, Calif., have been awarded a drilling contract for General Petroleum Corp. for 1 Capital, a wildcat test in Colusa County, California, northeast of the town of Colusa.

M. L. Richards, Big Spring, Tex., has finished a dry hole, drilled deeper from 3,063 ft. to 4,252 ft., in northwest Mitchell County, Texas. The failure is 4½ miles east of the Vincent pool, which produces from the Clear Fork lime at one completed well.

Rowan Drilling Co., Fort Worth, Tex., which has just completed the 24 Buras Levee District for Tide Water Associated Oil Co. at Venice field in Plaquemines Parish, Louisia-

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na, will be the contractor on the Tide Water's two new wells in the field, 25 Buras Levee, 1,450 ft. west and 400 ft. north of SE C 23-21s-30e, and 26 Buras Levee, 1,362 ft. south and 1,065 ft. east of NW C 34-21s-30e.

Rocky Mountain Drilling Co., Denver, Colo., has oil sand in Standard Oil Co. of California 1 Wegis Community, an outpost in the Greeley field, California, and has landed 7-in. casing for a production test.

Roeser & Pendleton, Inc., Fort Worth, Tex., has contracted to drill Westgate Oil Co. and Greenland Oil Co. 2 Louis Werner Sawmill Co., in 9-17n-2e, Oauchita Parish, Louisiana.

Noble Drilling Co., Ardmore, Okla., has contract to drill Stanolind Oil & Gas Co. and Carter Oil Co. 1 Smight Glover, Unit 1, in the Holly Ridge area of Tensas Parish, Louisiana.

Bell & Loffland, Los Angeles, Calif., drilling contractors, report oil and gas showings in Richfield Oil Corp. Tejon Ranch wildcats in 35-11n-19e, probably in Chanac which may have been passed up in other wildcats in the same area.

Muskegon Development Co. will drill on contract the United Drillers & Producers, Inc., Maurice A. and Flora B. Arms, in C S½ SE NW 7-14n-6e, Bay County, Michigan. The contractor will also drill Gulf Refining Co. 1 Jennie Schuman, in C S½ NE NE 12-14n-4e, Bay County, Michigan.

S. H. Howell, Alice, Tex., has contract for Butcher-Arthur, Inc., 1 Rowena Schaeffer, a new wildcat test projected to 7,000 ft., 15 miles northwest of Alfred in northwestern Jim Wells County, Texas.

Falcon-Seaboard Drilling Co., Tulsa and Houston, Tex., has received contract to drill Shell Oil Co., Inc., 16-B Realty Operators in 17-17s-15e, Terrebonne Parish, Louisiana.

J. W. Lang, Inc., will drill the Michigan Devonian Petroleum Co. and J. W. Lang, Inc., 1 Ralph Gerrits, in SW NW SW 12-4n-15w, Allegan County, Michigan.

Max Spidel has been awarded drilling contract on Roth & Bauierla 2 Arthur O'Dell, in NW NW SW 20-1n-13w, Allegan County, Michigan.

Perry-Busk & Ormiston have the contract on F. T. Canon and 1 W. E. Dickinson, in NE SE SW 31-1n-13w, Allegan County, Michigan.

Robert W. Atha has drilling contract on Gulf Refining Co. 2 Wieland-Knochel, in C S½ SE NW 35-15n-4e, Bay County, Michigan. Atha will also assist in drilling three wells in Mecosta County, Michigan, the 1, 2 and 3 George and Ruth Murray, respectively in C S½ NE SW 4-16n-7w, C SE SW 4-16n-7w, and C NE NW 9-16n-7w.

Harold McClure will drill the J. E. Hood 1 Jess Guernsey, in NE SW NE 19-8n-4w, Clinton County, Michigan.

Eugene Hilliard is the contractor on the Walter H. Eckert 1 Harty Taylor, in SE NE SW 32-8s-5e, Lenawee County, Michigan.

Drilling Association Seeks Names of Former Employes

The American Association of Oilwell Drilling Contractors, with headquarters in Dallas, Tex., has sent questionnaires to drilling contractors with the request that the contractors furnish lists of former drilling employes who are now employed in other defense industries. The list of names thus secured will be sent to the War Manpower Commission for immediate investigation, and it is believed that in this way many skilled workmen will be made available for the drilling industry. This procedure is in accordance with the WMC's offer to negotiate for the return of men to the drilling industry, where such men can best serve the war effort as oil-well-drilling crewmen and are willing to return to this industry.

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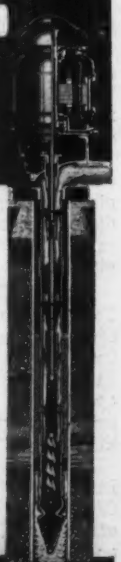

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PERSONALS

GEORGE H. CARD

Field Experience Is Mixed With Theory In His Career

GEORGE H. CARD, who became district superintendent for East Texas, the Panhandle and North Texas areas of Stanolind Oil & Gas Co. on July 1 this year, had several years of field experience before he completed his technical education.

He was born in Denver, Colo., and went to high school there and to the University of Colorado for 2 years before transferring to Stanford University from which he was graduated in 1924 with a B.A. degree

The old Mid-West Refining Co. put him to work in the Salt Creek pool, Wyoming, and he toiled there as a roustabout, gang pusher and tool dresser until 1929 when he returned to Leland Stanford for graduate work. He received a petroleum engineer's degree in 1932 and immediately joined the Stanolind organization at Wink, Tex., as a field engineer.

From West Texas he went to East Texas for a year, to the Fort Worth office of the company for a year and then to the Tulsa office for 2 years. In 1937, he returned to Fort Worth as division engineer, a post he held until his promotion to district superintendent.

He was an organizer and first president of the Petroleum Engineers Club of Fort Worth and is a member of the A.P.I. southwestern advisory and district pumping-equipment and engine committees. He is an active member of A.I.M.E.

Henry M. Brown, president of Midland Gasoline Co., has been appointed director of natural gas and natural gasoline in District 3 by the Petroleum Administration for War. He fills the vacancy created when D. E. Buchanan, district director in charge of PAW's activities in the Southwest area, relinquished the natural gas and natural gasoline directorship. He has been president of Midland since 1932 and obtained leave of absence when drafted by PAW.

Joseph L. Cruse, drilling foreman at Oilfields, San Joaquin division for Shell Oil Co., Inc., has been transferred to Bakersfield, Calif., and will continue there in his former capacity.

Joe T. Juhan, a well-known wildcatter in the Rocky Mountain area, is recovering at Glenwood Springs, Colo., from an appendectomy.

Forrest C. Piatt graduated as navigator and was commissioned as a second lieutenant October 7. He entered the U. S. Army on January 26, and is on leave from Shamrock Oil & Gas Corp., which he served in civilian life as a treater at the McKee plant, Texas Panhandle.

J. H. Croft, drilling contractor and oil operator of Fort Worth, Tex., suffered a broken leg last week when a truck in which he sat was overturned by a winch line on a drilling operation near Kermit, Tex.

Ed J. Hander, industrial engineer at Shell Oil Co. Inc.'s Houston, Tex., refinery, has been transferred to the company's New York office where he becomes job analyst in the personnel department.

Robert M. Newhall, Stoneham, Mass., has become the first student to complete training for an advanced degree at the Institute of Gas Technology at Illinois Institute of Technology, Chicago, Ill. He has just completed 2 years of graduate work in gas technology and was granted a master of science degree from Illinois Tech at its commencement October 17.

E. S. Robb, formerly assistant chief engineer at Shell Oil Co., Inc.'s Houston, Tex., refinery has been promoted to chief engineer succeeding **G. R. Henderson,** who resigned. Other promotions in the general upgrading in the engineering department are: **Ralph Stillinger,** formerly master mechanic, becomes assistant chief engineer; **J. P. Dobson,** assistant master mechanic, succeeds Mr. Stillinger; **William Cowgill,** zone supervisor, becomes assistant master mechanic. **C. A. Hansen,** tinner and rigger foreman, replaces Mr. Cowgill; **D. R. Lilley** succeeds Mr. Hansen as boilermaker foreman and **W. R. Carter** takes Mr. Lilley's former post as assistant.

Shifts—**W. E. Ulery,** superintendent, Process Oil Co., Aqua Dulce, to Palestine, Tex.; **E. I. Head,** engineer, Gulf Oil Corp., Three Rivers, to Schulenburg, Tex.; **E. T. Creegan,** engineer, Carter Oil Co., Rodessa, La., to Canton, Miss.; **L. B. Hosseo,** superintendent, Phillips Petroleum Co., Forsyth, Ill., to Wichita, Kans., **M. Stevenson,** superintendent, Cosco Oil Co., Ashland, Ky., to Huntington, W. Va.; **Loren L. Buck,** engineer, Ashland Oil & Refining Co., Catlettsburg, to Ashland, Ky.; **Ernest Allen, Jr.,** engineer, Phillips Petroleum Co., Kaw, Okla., to Blanket, Tex.; **R. D. Evans,** superintendent, Phillips Petroleum Co., Okmulgee, Okla., to Borger, Tex.; **R. W. Hirsch,** engineer, Shell Oil Co., Tulsa, to Skellytown, Tex.; **H. D. Dickson,** engineer, Humble Oil & Refining Co., Katy, to Midland, Tex.; **W. A. Drake,** superintendent, Humble Oil & Refining Co., Montegut, La., to Corpus Christi, Tex.

Richard C. McCurdy, chief exploitation engineer in the Los Angeles, Calif., office of Shell Oil Co., Inc., has been relieved of his special assignment at Washington, D. C., and has returned to his regular post on the Pacific Coast.

Harold M. Toler won his wings and a commission as second lieutenant, U. S. Army, at Douglas, Ariz., on October 1. He is now stationed at Hobbs, N. M. He is on leave as a controlman at the McKee plant of Shamrock Oil & Gas Corp.

Joe Miller has been appointed shift foreman in the gas department at Shell Oil Co.'s refinery at Houston, Tex.

Wallace Linville, General Petroleum Corp., was recently elected chairman of the southern California section, S.A.E., and **Gerthal French,** Richfield

Oil Corp., and **Earl Cooper** of Union Oil Co. were elected members of the governing board for the 1943-44 term.

John C. Kalbach, who, in his capacity as senior supervisor, has recently completed participation in the establishment of new productive facilities for explosives at the Plum Brook ordnance works of the Trojan Powder Co., has joined the staff of the Gas Institute to coordinate research and development activities in the field of gaseous reactions. Formerly, he was assistant production manager of Kentucky Color & Chemical Co., where he was in charge of the development of several pigment and high-temperature processes.

Dr. R. G. Atkinson, superintendent of manufacturing at the McKee plant of Shamrock Oil & Gas Corp. near Dumas, Tex., has moved to the Amarillo office of the same company to do research and development work.

Lawrence C. Bischmann has been added to the research staff of the Institute of Gas Technology as analytical chemist. Mr. Bischmann, who is a graduate of DePauw University, was formerly associated with Public Service Co. of Northern Illinois and Universal Oil Products Co.

Elmer Olsen has been appointed assistant to **George O'Brien,** vice president of Standard Oil Co. of California and will have offices at the Los Angeles offices of the company.

Boysie A. Wulfman, formerly chief meterman in the natural-gas division of Shamrock Oil & Gas Corp., Amarillo, Tex., was recently promoted to assistant foreman of the natural-gas division. He has been employed by Shamrock since April 1937, having started as a laborer and has held the position of clerk, gas accountant and tester.

Frederick J. Toth, who has been a field engineer for Shell Oil Co., Inc., in the San Joaquin division, has been appointed foreman of the production department in the Ventura district succeeding **William E. Higginbotham,** who has retired after 27 years continuous service in the drilling department.

Eugene N. Shepard, on leave from the engineering department of the Shamrock Oil & Gas Corp., and now a first lieutenant in the U. S. Army Engineers, was recently transferred to staff duty in England. He has been overseas since August 1942 and in the Army since November 1940.

Russell Palmer, former editor of Petroleum World, has joined the PAW District 5 staff and will have charge of all releases in addition to assisting the director in charge. He will office at Los Angeles, Calif.

J. P. Shannon retired October 4 as general manager of Snowden & McSweeney, with headquarters in Fort Worth, Texas. Mr. Shannon has been in the oil business over 50 years.

William Neilson, Jr., exploitation engineer at Oilfields, Calif., San Joaquin division, for Shell Oil Co., Inc., has been transferred to Sacramento.

Claud B. Hamill, independent oil operator of Houston, Tex., resigned last week as cochairman of the Harris County War Finance Committee in order to devote more time to his own business. Mr. Hamill had served on the committee since January 1942.

James Harrop, superintendent of the Baytown, Tex., refinery of Humble Oil & Refining Co., was chosen president of the Goose Creek Chamber of Commerce last week.

J. W. Parks, instrument maintenance supervisor at Fairland, Okla., for Shell Pipe Line Corp., has been granted the grand prize in the company's fourth annual employes' suggestion contest.

N. W. Bass, a member of the staff of the U. S. Geological Survey at Tulsa, has been transferred to Denver, Colo., in charge of a branch office opened there.

Max W. Ball, organizer and latterly consulting geologist for Abasand Oils, Ltd., operating in the Athabaska tar sand area of northern Alberta, was a guest of honor at a dinner meeting of the Edmonton branch of the Canadian Institute of Mining and Metallurgy on the eve of his departure to take over a wartime post at Washington, D. C.

Fred W. Herlihy, president of Power Oil Co., Orangeburg, S. C., and recently elected president of the National Oil Marketers Association, was named a member of the Petroleum Industry War Council last week. He takes the place of **Royal E. Decker,** president of Plymouth Oil Co., Detroit, Mich., who formerly represented the marketers association on PIWC.

Grant W. Corby, geologist, engineer and former mayor of Arcadia, Calif., was among the former prisoners of the Japanese returning home on the liner Gripsholm. Mr. Corby, whose residence now is in Beverly Hills, Calif., went to the Philippines in August 1941, to make a geological survey for the U. S. Government. He was taken prisoner in Manila and was interned near Shanghai for a year.

Henry V. Earnest, of Shreveport, La., in civilian life a rig builder in various oil fields, has received promotion in the field from master sergeant to second lieutenant in the Thirteenth Army Air Force in the South Pacific. Lieutenant Earnest was awarded the Silver Star for heroic service in action at Midway.

Edward K. Garrison has been appointed Pacific Coast regional manager of the Tank-Car Service Section of the Division of Petroleum and Other Liquid Transport, in the Office of Defense Transportation. His headquarters will be in San Francisco, Calif.

Robert R. Burns, former employe of Sinclair Refining Co., Houston, Tex., before joining the Navy, has been promoted to boatswain's mate first class for rescuing an officer from death by drowning when the man was blown from the bridge of the U.S.S. San Francisco at Guadalcanal.

M. H. Hobbs, of N.K.P.M., formerly in the East Indies; **Johnny Aston,** of Ultramar Co., Ltd., from Argentina; **Ray J. Towsey,** of Cia Consolidada de Petroleo, from Venezuela; **A. F. Driskill,** of Iraq Petroleum Co., from Iraq, and **H. F. Brewen,** of International Petroleum Co., Ltd., from Peru, were among guests from foreign countries attending the regular October meeting of the Los Angeles, Calif., chapter of the Nomads.

Frank Phillips, chairman of Phillips Petroleum Co., will give $100,000 to the Oklahoma Baptist Orphans' Home in Oklahoma City, Okla., it was announced this week by Dr. Andrew Potter, executive secretary of the Baptist General Convention of Oklahoma, and Gov. Robert S. Kerr, chairman of the convention's orphans' home committee. The gift is to be made through the Frank Phillips Foundation. The money will be used to complete the "Children's City."

J. H. Contino, vice president and treasurer of National Transit Co., Oil City, Pa., since 1938, has been elected president of the company, succeeding the late Daniel M. Sachs. He joined the company in 1903, and in 1918 became assistant treasurer. In 1921 he was elected a member of the board. **S. D. Osborne,** superintendent of transportation, was elected vice president; **R. L. Lockwood,** assistant treasurer, was elected treasurer, and **Charles J. R. Mason,** agent in charge of the production department, was elected to the board to succeed Mr. Sachs. **E. H. Fortmann,** general manager, was appointed assistant to the president, and **James E. Hynes,** cashier, was named assistant treasurer.

Market Developments

East Coast

NEW YORK.—The critical condition of gasoline stocks in District 1 was revealed last week when the A.P.I. revised its index of available supplies for civilian consumption and issued indexes for individual products. These showed gasoline stocks at 34.9 per cent of normal (1940-41 average). This was a slight improvement from the previous week and may reflect a seasonal decline in demand.

The report showed residual fuel oil stocks at 81.1, a decline of 2.3 points from the previous week. In view of savings resulting from conversions, current stocks of heavy fuel oil are more than adequate. This was indicated by the 12-cent reduction in the barrel price of high-gravity fuel oil due to the availability of large quantities of lower-gravity material. This reduction, which was widespread, was followed in some instances by corresponding tank-wagon price declines. The reduction exactly halved the premium on high-gravity residual-fuel oil.

This condition was viewed by some as only temporary due to the increasing tightness in the coal situation. It is regarded as probable that plants equipped with convertible equipment will have to revert to oil for fuel and the resulting increase in demand is expected to ease the pressure now exerted on heavy-fuel oil.

Mid-Continent

INCREASING pressure on refiners was apparent this week in a market which saw growing scarcity of virtually all oil products except the heavy fuels. Action of the Petroleum Administration for War in setting up preferential groupings, some of which are to receive "unquestioned preference, even though the production of secondary materials is curtailed," made it quite clear that the civilian's share of gasoline will shrink still further. Buyers seeking gasoline in the Mid-Continent territory reported that offerings had dried up completely. Refiners said they were far behind in filling orders already on the books. With minor exceptions, the only gasoline that is being sold below ceiling prices is what refiners, in some instances, are shipping to marketers with whom they have had long-standing business relations. Almost all interrefinery sales, it was said, are made at ceiling prices.

Major refiners are prorating gasoline to their service stations and bulk plants. The proration is based on average monthly shipments over an extended period. Exceptions are made in some cases in order to meet military or agricultural needs.

The lubricant market has become almost as tight as gasoline. The only offerings are said to be low-viscosity neutrals. Refiners reported they were refusing business in other products in this division.

Generous buying by railroads was reported to be keeping most residual-fuel stocks from getting out of hand, though some refiners were understood to be in an awkward position owing to swollen inventories.

Gulf Coast

HOUSTON, Tex.—Extreme tightness persisted this week in the Gulf Coast refinery gasoline market. Heavy calls for material by government agencies and for lend-lease shipments prevent refiners from restoring motor-fuel stocks to normal.

The September report on consumption of gasoline in Texas shows that government consumption in the state is nearly triple the rate of 1942 and that civilian demand is constantly diminishing.

Tax exempt sales to the government in September totaled 145,263,442 gal., compared with 144,106,050 gal. in August and 49,916,061 gal. in September last year. Gasoline consumed by other purchasers in September totaled 101,616,354 gal., compared with 107,621,750 gal. in August and 117,224,600 gal. in September 1942.

Between November 1942, the month before gasoline rationing started in Texas, and August this year, distributors reported an average monthly decrease of 15,920,468 gal. in sales to consumers other than government agencies.

The sustained increase in government consumption of gasoline is one of the explanations why Gulf Coast refiners are unable to maintain stocks at comfortable working levels.

Batch movement of heating oil through the WEP 24-in. crude-oil line during November is under consideration by the transportation and supply divisions of PAW. If the plan is made operative, more of the manufacturing emphasis may be diverted from motor gasoline.

Pacific Coast

LOS ANGELES, Calif. — Pessimism is dominant in California marketing circles. Service stations have started closing again and this trend will probably continue as not many can operate successfully on the basis of 3-gal. coupons. With a possibility of 2 gal. weekly next year the outlook is doubly uncertain.

In addition to suspensions of service stations, three bulk stations were closed recently, two of which were in California.

Not only are marketers turning down additional business on the Pacific Coast but they are not making full normal deliveries, some having adopted the practice of dumping part at one station and the balance at another. This is being done in order to equalize stocks as many independent service stations were caught with empty tanks when the order went into effect restricting the amount of premium gasoline that could be made.

Major marketers, as far as possible, will attempt to maintain sales of all three grades of gasoline but premium sales, which have been increasing since rationing started, will be restricted to the quantity available. Third-grade gasoline has been practically discarded and in those stations where it is available it is usually a back pump.

There has been very little trading in the spot market as those marketers fortunate to have first grade and premium gasoline are conserving stocks.

A.P.I. REFINERY REPORT

Week Ended October 23, 1943

(Figures in thousands of barrels)

	Dly. crude runs to stills	Stocks: Gasoline	Stocks: Residual	Stocks: Gas oil
Appalachian	137	2,190	399	920
Ind., Ill., Ky.	764	13,405	3,223	6,424
Okla., Kan., Mo.	350	6,274	1,374	2,401
Censored area*	2,092	30,690	18,625	21,102
Rockies	98	1,087	727	433
California	719	15,150	40,399	12,029
Total 10-23-43	4,160	68,796	64,747	43,309
Total 10-16-43	4,171	68,182	65,518	42,237
Total 10-24-42	3,775	77,057	79,142	48,102

*Reports combined on East Coast, Texas Gulf, Louisiana-Arkansas and Inland Texas at request of PAW.

CRUDE-OIL STOCKS

(Bureau of Mines Estimate)

Week ended:	Bbl. of crude*
October 23, 1943	235,998,000
October 16, 1943	233,997,000
October 24, 1942	237,986,000

*Excludes unrefinable California stocks.

Refinery Prices

(Prices as of November 2, 1943)

Quotations are f.o.b. plant in cars and in cents per gallon except where otherwise noted. They are exclusive of the federal excise taxes of 1.5 cents a gallon on gasoline and 4.5 cents a gallon on lubricating oils, and do not include marine lighterage charges.

REFINERY GASOLINE

Octane (A.S.T.M.):	†80	74-76	70-72	68-70	63-66
Mid-Continent*	.....	.....	6.000	.....	5.625
Pennsylvania	.....	6.750-7.000	.....	.....	.....
Gulf Coast	6.00-6.50	.....	§5.750-6.250	§5.750-6.250	§5.250-5.750
Northeast Coast	9.80	.....	9.2	9.2	.....
California	6.750-7.500	6.250-6.500	6.125-6.250	5.750-6.125	5.125-5.500

*Basis Group 3. †1939 C.F.R. (research method). §Unleaded.

KEROSENE AND NO. 1 FUEL OIL

Gravity:	46	45	42-44	41-43	38-40
Mid-Continent*	....	.....	4.500	4.375	....
North Louisiana	.....	.....	.....	4.500-4.750	.....
Pennsylvania	6.250-6.625	6.125-6.250	.....	.....	.....
California	....	.....	.....	4.500-5.500	4.250
Northeast Coast	...	.....	.....	6.80	.....
Gulf Coast	.....	.....	.....	4.125	.....

*Basis Oklahoma Group 3

TRACTOR, DIESEL, AND BUNKER FUEL OIL

Specifications:	46-48° G	34 D.I.	48-52 D.I.	56 & above	Diesel bunkers	Residual Bunker C†
Mid-Continent*	4.125	.....	.....	.....	.....	$0.80-1.27
California	.....	2.750-4.000	.....	.....	‡1.35-1.45	1.10-1.15
Gulf Coast	.....	....	4.000	4.125	1.45	0.85-1.27
Northeast Coast	.....	.....	.....	6.800	2.780	1.65-2.07
North Louisiana	....	....	.....	.....	.....	0.80-1.27

*Basis Oklahoma Group 3. †Gravity range. ‡Pacific Specification 200

FURNACE OIL, GAS OIL, FUEL OIL

	No. 2	No. 3	No. 5	No. 6
Mid-Continent*	3.625	3.500	$0.85	$0.80
Pennsylvania (West)	5.875-6.125	5.875-6.000	†5.250-5.500	.....
Northeast Coast	6.7	6.7	1.95	1.65
California	5.5	5.5	‡1.10-1.25	‡1.10-1.15
Gulf Coast	3.750-3.875	....	1.35	0.85

*Basis Oklahoma Group 3 †36-40 gravity fuel. ‡Pacific Specification 300 §Pacific Specification 400.

NATURAL GASOLINE

Grades:	26-70	18-55
Oklahoma (Group 3)	4.750	5.700
North Texas	4.375	5.250
North Louisiana	4.375	5.250
California	4.875	5.500

LUBRICATING OILS

Bright and Steam Refined

OKLAHOMA (Group 3)—

200-210 D, 10-25	27.00
150-160 D, 0-10	23.00
120-125 D, 0-10	22.00
Steam refined:	
400 dark green (untreated)	9.00

PENNSYLVANIA—

Bright Stocks (Pennsylvania Grade No. 8 color, 140-150 at 210, 545-550 flash)

10 pour point	30.50
15 pour point	29.50
25 pour point	28.00
Steam refined:	
600	16.00
650	16.50
600 flash	17.50
650 flash	17.50

Neutral Oils

Vis at 100° F. except Pennsylvania and color N.G.A.)

OKLAHOMA (Group 3)—

0-10 pour point:	
300-3	15.00
300-3	18.00
500-3	19.50
600-3	20.00

Note: Viscous neutrals, 10-25 pour, quoted 0.5 cent under 0-10 oils.

CALIFORNIA—

300-3½-3	7.00	7.75
400-3-4	7.25	8.00
400-3-4	8.75	11.00

Neutral Oils

Red oils:		
200-4-5	7.00	7.75
400-5-6	9.00	11.00
500-900, 5-6½	9.25	11.25

GULF COAST—

Pale oils:		
200-3	8.50	8.75
300-3	9.00	9.25
500-3½	9.75	10.00
750-3½	10.00	10.25
2,000-4	10.50	10.75
3,000-4	12.25	12.50

PENNSYLVANIA—

150 vis. at 70° F., 3 color, 400-405 flash:	
Zero pour point	37.50
10 pour point	36.50
15 pour point	35.50
25 pour point	30.00
200 vis. at 70° F., 3 color:	
Zero pour point	39.50
10 pour point	38.50
15 pour point	37.50
25 pour point	32.00

WAX

(Cents per pound)

OKLAHOMA (Group 3)—

124-126 (A.m.p.) w.c. scale	4.250

PENNSYLVANIA (inland refineries)—

122-124 (A.m.p.) w.c. scale	4.250
124-126 (A.m.p.) w.c. scale	4.250

NEW YORK—

Wax in bags fully refined:	
130-132 (A.m.p.) wax	6.850
133-135 (A.m.p.) wax	6.150
Crude scale:	
124-126 (A.m.p.) w.s	4.250
124-126 (A.m.p.) y.s	4.250

TANK-WAGON PRICES IN 50 CITIES

(Gasoline prices based on regular grades tax included, undivided dealer)

ATLANTIC AND NEW ENGLAND

(Socony-Vacuum Oil Co., Inc., and Atlantic Refining Co.)

	Dealer tank wagon	Combined tax	Kero tank wag
Baltimore, Md	15.95	5.50	10.50
Boston, Mass.	14.90	4.50	10.10
Burlington, Vt	16.90	5.50	10.30
Buffalo, N. Y.	16.20	5.50	10.90
Dover, Del.	16.70	5.50	12.30
Hartford, Conn.	15.60	4.50	10.00
Manchester, N. H.	17.30	5.50	12.10
Newark, N. J.	15.30	4.50	10.00
New York, N. Y.	16.10	5.50	10.10
Philadelphia, Pa.	16.20	5.50	11.90
Pittsburgh, Pa.	16.70	5.50	12.30
Portland, Me.	16.30	5.50	10.20
Providence, R. I.	15.00	4.50	9.90
Washington, D. C.	15.20	4.50	11.30
Average 14 cities	16.02	5.14	10.80

(All prices undivided dealer basis.)

CENTRAL

(Standard Oil Co. of Indiana, Standard Oil Co of Ohio, Continental Oil Co. and Texas Co.)

	Dealer tank wagon	Combined tax	Kero tank wag
Chicago, Ill.	14.10	4.50	10.00
Cleveland	15.00	5.50	*9.00
Dallas, Tex.	13.00	5.50	7.00
Des Moines, Iowa	14.40	4.50	10.10
Detroit, Mich.	14.40	4.50	10.00
Fargo, N. D.	16.90	5.50	11.90
Huron, S. D.	16.30	5.50	11.00
Indianapolis, Ind.	15.60	5.50	10.10
Little Rock, Ark.	17.50	8.00	10.00
Milwaukee, Wis.	16.10	5.50	10.80
Minneapolis, Minn.	15.90	5.50	10.00
Omaha, Neb.	15.40	6.50	9.80
Tulsa, Okla.	16.50	7.00	8.50
Wichita, Kans.	13.30	4.50	8.70
Average 14 cities	17.46	5.57	9.84

*Includes 1-cent state tax.

SOUTHEASTERN

(Standard Oil Companies of New Jersey Kentucky, and Louisiana)

	Dealer tank wagon	Combined tax	Kero tank wag
Atlanta, Ga.	18.90	7.50	*11.00
Birmingham, Ala.	18.50	8.50	9.00
Charleston, S. C.	18.95	7.50	...
Charleston, W. Va.	19.25	6.50	13.30
Charlotte, N. C.	20.10	7.50	11.30
Jacksonville, Fla.	18.90	8.50	9.50
Jackson, Miss.	17.50	7.50	†9.00
Louisville, Ky.	16.50	6.50	8.50
Memphis, Tenn.	17.90	8.50	10.50
New Orleans, La.	17.75	8.50	10.00
Norfolk, Va.	17.45	6.50	12.30
Average 11 cities	18.34	7.50	10.50

*Includes 1-cent state tax.
†Includes ½-cent state tax.

MIDWESTERN

(Continental Oil Co.)

	Dealer tank wagon	Combined tax	Kero tank wag
Albuquerque, N. M.	17.50	7.50	10.00
Boise, Idaho	20.10	6.50	16.50
Casper, Wyo.	17.00	5.50	12.00
Denver, Colo.	14.50	5.50	11.00
Helena, Mont.	17.00	6.50	13.00
Phoenix, Ariz.	18.50	6.50	12.50
Reno, Nev.	17.50	5.50	13.50
Salt Lake, Utah	18.50	6.50	14.50
Average 8 cities	17.58	6.25	12.80

PACIFIC COAST

(Standard Oil Co. of California)

	Dealer tank wagon	Combined tax	Kero tank wag
Portland, Ore.	17.00	6.50	13.50
San Francisco, Calif.	14.50	4.50	11.50
Seattle, Wash.	17.00	6.50	13.00
Average 3 cities	16.17	5.83	13.00
Average 50 cities	16.59	5.96	10.93

Equipment Progress

Opens New Store

Bethlehem Supply Co. has opened a new store in Kermit, Tex. The store personnel consists of C. L. Richardson, store manager and field representative, and C. M. Stice, assistant store manager. The new store will be under the direct supervision of R. E. Throckmorton, district manager, who makes his headquarters at Odessa, Tex.

Four-Way Gun Perforator

McCullough Tool Co., Los Angeles, Calif., and Houston, Tex., is now operating a gun perforator which produces six perforations per foot, or 30 perforations in a 5-ft. section. The perforations are in four staggered rows 90° apart. When a zone of considerable thickness is to be perforated, several guns are joined together to perforate a section of 10, 15 or 20 ft. on each run. The spacing of the perforations is the same when the multiple guns are used. When more than six holes per foot are desired, the casing is perforated a second time, the gun being positioned an inch higher or lower than the first time. Thus, four additional staggered rows of holes are obtained, giving 12 holes per foot.

Due to the fact that all shots are fired simultaneously while the gun perforator is at rest, the spacing of the perforations is exact and uniform, being a projection of the position of the barrels in the gun perforator.

The 3½-in. o.d. gun fires ¼, ⅜, ½ and ⅝-in. bullets. The 4¼-in. o.d. gun fires ¼, ⅜, ½, ⅝ and ¾-in. bullets.

As in the case of all other McCullough gun perforators, the 30-shot guns are fired either electrically or mechanically when run on wire line. McCullough completely equipped service units, operating from 16 service branches in active domestic areas, carry the required conductor cable, line-measuring device of proved accuracy, and all other equipment. This gun perforator can also be run on drill pipe or tubing, either singly or in multiple, and is fired mechanically by means of a go-devil dropped inside the pipe or operated on a measuring line. This latter method permits the utilization of careful measurements of the pipe in positioning the gun perforator at the exact point designated in the hole.

Pipe-Joint Compound Expands as It Sets

The difficulties of getting pipe-joint compound for use in pipe lines carrying Calodorent and Pentalarn has now been solved. Tests recently conducted by the laboratories of X-Pando Corp., 43-15 Thirty-sixth Street, Long Island City, N. Y., have shown that X-Pando pipe-joint compound will serve perfectly for joints of pipes carrying these materials.

This pipe-joint compound is a special cement which expands as it sets, ending leaks permanently. The expansion of the pipe-joint compound actually corrects imperfections in threads and smooths flange faces. Yet joints sealed with the compound can be readily taken apart.

X-Pando pipe-joint compound is supplied in one formula only. This one formula will hold anything carried in metal pipes except certain heavy acids. It withstands deflection, sharp temperature changes and vibration and pressure.

Briggs Clarifier Wins Army-Navy "E"

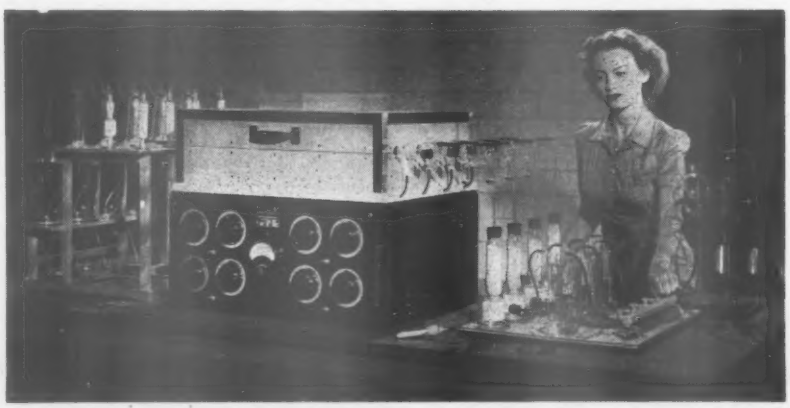
Briggs Clarifier Co. received the Army-Navy "E" award in impressive ceremonies at its plant in Bethesda,

Md., September 25. The award was presented by Rear Adm. C. H. Woodward, chief of the Incentive Division of the Navy. Maj. Gen. C. M. Wesson, Office of the Lend-Lease Administrator in Charge of the Division for Soviet Supplies, presented award pins to representatives of the two plants and the main office. The award was accepted for the company by Southwick Walbridge Briggs, general manager, and Chase Donaldson, president. James Davie Roberge, works manager, accepted the "E" pins on behalf of the employes who were represented on the speakers' platform by Mr. Roberge for the industrial plant, Harrison Nichols for the refill plant, and Georgia Regn for the general offices.

MULTIPLE ANALYTICAL COMBUSTION FURNACE

Four parallel combustion tubes in a multiple furnace permit the operator to make four carbon-hydrogen determinations simultaneously in one form of a new unit developed recently by Universal Oil Products Co. and offered commercially by Precision Scientific Co., Chicago, Ill.

The unit can be built to suit specific jobs, and consists of (1) an electrically-heated furnace, 24 in. long; (2) oxygen-purifying system for com-



bustion gases; (3) an oxygen pressure-regulating column, and (4) calcium chloride tubes for water absorption, Ascarite tubes for absorbing carbon dioxide.

This unit, which may include any reasonable number of combustion tubes, was first developed as a means of determining carbon on oil cracking catalysts, but may be used for any purpose at temperatures below 540° C. (1,000° F.)

Tulsa Winch Wins Award

Tulsa Winch Manufacturing Corp., Tulsa, is shown receiving the Army-Navy "E" flag at ceremonies in Tulsa.

Lt. Col. R. W. Coward, executive officer of the St. Louis Ordnance District, commended the company on diverting their resources to war production without assistance from the Government. Commander Nicholson, assistant public relations officer, presented "E" lapel pins to W. H. Patterson, machinist, who is the oldest employe of the firm from point of service.

Shown with the flag (left to right) are Lt. Col. Coward, Commander Nicholson, Patterson and O. L. Shirley, chief engineer for Tulsa Winch.

Developing Devices to Aid Navy in War

"New and urgently needed mechanisms for more effectively waging the war at sea" are being developed by the company's engineers, Capt. Roy W. Bruner, U.S.N., disclosed as he presented the Army-Navy "E" award to the employes of the Brown Instrument Co., Philadelphia, Pa., a division of Minneapolis-Honeywell Regulator Co.

In accepting the "E" award in behalf of the employes of the company he founded, Richard P. Brown, chairman of the board, pointed out that the firm's great increase in production has been accomplished without the building of new facilities, which would have involved the use of steel and other critical materials.

E. B. Evleth, vice president and general manager, and Joseph Abbott, president of Local 116, United Electrical, Radio and Machine Workers of America, jointly representing management and labor, received the "E" pennant from Captain Bruner, after which it was raised by a color guard of plant police.

Lt. Col. Robert G. Allen, executive officer of the Philadelphia ordnance district of the Army, made the formal presentation of the "E" lapel insignia to a group of six men with a total combined service of 175 years, who represented all the employes.

In accordance with the request of the armed forces to keep "E" award ceremonies from cutting into war production, the company erected a huge tent over the parking lot in the rear of the main plant. Employes were able to step from the building right into the tent, where the ceremony was held and lunch served.

K&E Awarded 4-Star Army-Navy "E"

Keuffel & Esser, Hoboken, N. J., manufacturers of drafting and engineering equipment for more than three-quarters of a century, has been awarded the four-star Army and Navy "E".

This latest award to the company and their more than 2,000 employes, is the fifth which they have received from the Army and Navy as a credit to their 2½ years of sustained excellence in the production of precision instruments for the United States armed forces.

Among Equipment Men

Gollum Now Associated With John Baird

R. L. GOLLUM

R. L. Gollum, of Security Engineering Co., has recently moved to New York City, where he will be associated with John Baird, export representative. Mr. Gollum was with Security Engineering Co. for 6 years in California, and also worked in the fields of Illinois and Louisiana. Mr. Baird handles export accounts of American Iron & Machine Co., Baird Manufacturing Co., Security Engineering Co., Unit Rig & Equipment Co. and International Cementers.

Guerasimoff Promoted By Buda Co.

C. N. Guerasimoff, formerly assistant chief engineer, has been appointed by H. G. Smith, executive engineer, to position of chief engineer of the engine division of Buda Co., Harvey, Ill.

Mr. Guerasimoff has been with Buda Co. for the past 9 years during which time he has served as mathematician, engineer on stress analysis and design engineer on gasoline development and testing of diesel engines. In August 1941 he was appointed assistant chief engineer in charge of the radial diesel engine division.

Leschen Promotes Two

R. P. Tyler has been appointed general manager of sales, and C. R. Deam assistant manager of sales for A. Leschen & Sons Rope Co., St. Louis, Mo., according to an annoucement by the company.

Johns-Manville Promotes E. A. Phoenix

E. A. PHOENIX

The appointment of E. A. Phoenix as assistant manager of the Transite Asbestos pipe department of Johns-Manville is announced by T. K. Mial, vice president in charge of industrial sales.

Mr. Phoenix began his business career with the Kieselguhr Co., of America in 1915. This firm later became Celite Products Co. which became part of Johns-Manville Corp. in 1928. After serving in various sales and advertising positions, Mr. Phoenix was made assistant sales promotion manager in April 1936. In May 1942 because of his knowledge of the company's widely diversified product lines, he was transferred to the priorities department, a position which he held until his recent promotion.

Dehydro Announces Changes

Harry Horton, sales manager for Dehydro Co., Tulsa, announces appointment of J. B. (Bo) Robinson as Tulsa district manager for the company. Before joining Dehydro Co. Mr. Robinson was for a number of years a gager for Stanolind Pipe Line Co. in West Texas. Later he was district foreman for Forest Producing Co.,

covering the first water-flooding projects in the Big Creek area.

W. M. (Bill) Best, who represented the company for 6½ years in the Seminole-Ada and Tulsa districts, is now located in the eastern Kansas district with headquarters at Eldorado, Kans.

Greenlee Made District Manager for Shand & Jurs

Joe M. Greenlee has been appointed Texas and Louisiana manager for Shand & Jurs Co., with headquarters at the company's new office and warehouse, 3828 Polk Avenue, Houston, Tex. Mr. Greenlee is well known in the Gulf Coast territory and has had many years' experience in the line of tank fittings for gaging and vapor conservation.

Langley Will Return To South America

W. C. Langley, sales agent for oilfield equipment in Venezuela, Trinidad, Colombia, Peru and Ecuador, was scheduled to return to South America about November 1, after spending 3 months in the United States. During the past 3 months Mr. Langley has been visiting Gulf Coast, California and Mid-Continent fields, and more recently visited New York City.

In South America, Mr. Langley represents Byron Jackson Co. (Oil Tools Division), Elliott Core Drill Co., International Cementers, Inc., American Iron & Machine Works, and General Geophysical Co.

Prior to entering the oil-equipment sales field in 1938, Mr. Langley was connected with the producing division of Standard Oil Co. of Venezuela in Venezuela for several years and also spent 3 years in Africa with Sinclair Oil Corp.

Cox Transferred to Pittsburgh For Lee C. Moore

Walter H. Cox, who for the past 4 years has been sales representative for Lee C. Moore & Co., Inc., with headquarters at Evansville, Ind., has been transferred to the company's home office in Pittsburgh, Pa., where he will have charge of oilfield sales in the states of Pennsylvania, New York, West Virginia, Ohio and Michigan.

Classified Advertising

EQUIPMENT WANTED

WANT TO BUY—Light portable slim hole rig for 3000' of 7" hole. Sullivan Model 300 or Franks Machine FDM. Truck or skid mounted. Must be A-1. Write Oilman, 2105 Parkway St., Bakersfield, California.

WANTED

Unlimited quantity of
Structural Steel — Pipe — Tubing
Casings and Valves, all sizes.

SONKEN-GALAMBA CORP.
Kansas City (18), Kansas

WANTED: Tower 6' x 40' x ¾" Arrow Petroleum Co., 7419 Franklin St., Forest Park, Illinois.

We Are Interested in Purchasing

Refineries
Pipe Lines
Tank Farms
Gasoline Plants
Power Plants
Industrial Plants
Surplus Materials

No plant is too large or too small for our inspection. Let us quote on your nonproductive properties and aid the nation by critical material reclamation.

Brown-Strauss Corporation
1402-1700 Guinotte Kansas City, Mo.
Phone HArrison 1000.

EQUIPMENT WANTED

WANTED: Well servicing unit, either double or single drum. Please give full description, condition, location, power and price in first letter. Ford Chapman, Box 102, Pecos, Texas.

WANTED: ½, ¾ or 1 yd. Shovel or Crane. Also Front End Loader. 100 to 150 H.P. Gasoline Engines. MERTES MACHINERY CO., Milwaukee 4, Wisconsin.

WANTED: Hot Oil Pump, Arrow Petroleum Co., 7419 Franklin St., Forest Park, Ill

PARAFFINE WAX EQUIPMENT (USED)

Four Chillers, Worthington Carbondale type, twelve sections each, 6" and 8" pipe, complete with supports, gears, sprockets, drive chain, helical conveyors.
Four Presses, Wax, Worthington Carbondale type, or similar, 400 psi. filtering pressure, 450-48" diam. plates, complete with drainage plates, spacing rings, side rods, tension rods, valves, supports etc. Give date of installation, number of years in service, blue prints if available, date abandoned and present condition.

FRED DEAN SMITH
74 Trinity Place, New York City
Telephone: Whitehall 4-7253

EQUIPMENT FOR SALE

FOR SALE: At Oil Hill, Kansas, 2—#62 35 Ton Duff Ball Bearing Screw Jacks, lot $100.00. Cities Service Oil Co., Patridge, Bartlesville, Oklahoma.

¼" to 2" "Williams" motor driven portable pipe and bolt machine. Will sell worth the money. P.O. Box 4441, Phone 3-8212, Oklahoma City, Okla.

FOR SALE: In Kansas 1 #10 Adams Leaning Wheel Grader. Steel wheels and tractor hitch. $650.00. Patridge, Cities Service Oil Co., Bartlesville, Okla.

EQUIPMENT FOR SALE

27—30,000-BARREL oil storage tanks Former property of the Ohio Oil Co., located at Findlay, Ohio. Will sell as tanks or plates. Will dismantle, matchmark and load on cars. Phone, wire or write. Plant and Equipment Purchasing Co., 1300 Fountain Square Bldg., Main 2143, Cincinnati 1 Ohio.

FOR SALE: Drilling equipment. Power pumps, steam pumps, boilers, drilling units tables, swivels, kellys, hooks, crown block traveling block, etc., cable tools, bits, stems engines, swivel winches, drilling clamps temper screws, etc. Write us your wants Oil Well Drilling Company, 706 Dallas National Bank Building, Dallas, Texas.

FOR SALE
1—Model RL Cardwell Double Drum Spudder, powered with a Model GAK Waukesha Motor, equipped for natural gas or Butane.
1—Lebus Unitized Rotary Draw works with reverse clutch.
1—Model R4I Climax Drilling Engine, equipped for natural gas or Butane.
1—Model R6I Climax Drilling Engine, equipped for natural gas or Butane.

Big Chief Drilling Co. Partnership
Phone 1139, Salem, Illinois. P.O. Box 387.

FOR SALE: Nine Tractors and Nine Semi-Trailer Tanks, 4000-5000 gallon capacity, equipped with air brakes, safety valves and unloading pumps. All equipment in good running condition, running every day. Owner leaving for service. Box B-856, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: 1—complete 5 well hookup consisting of 40 HP. Twin Crank OCS Unit. 2—Donnell Powers. 5—Heavy Duty Texas Steel Jacks. 2,500 ft. of Heavy Duty Rod Line complete with Clamps, Stroke Post, Knock Off Equipment. All in A-1 condition at 50% ceiling price. Jack Anderson Engine Company, Kilgore, Texas.

FOR SALE: At Oklahoma City—2600' used 9" OD 40# API-C Seamless Steel Casing. Price $2.1142 per foot. Cities Service Oil Co., Patridge, Bartlesville, Okla.

FOR SALE: Reconditioned temperature and pressure recorders, also temperature recorder controllers. All instruments and repair work guaranteed. McGatlin Instrument Co., 1612 Bryan St., Dallas, Texas.